The Business Magazine for Makers & Users of Chemicals
Management, Research, Production, Marketing

CHEMICAL INDUSTRIES

Contents

Volume 49 Number 4

OCTOBER, 1941

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Feature Articles

Plant Operation and Management

New Chemicals for Industry

Chemical Specialties

News of the Month in Review

Part 2: Statistical and Technical Data Section

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Offices

New York: 522 Fifth Avenue, Murray Hill 2-7888
Chicago: 309 West Jackson Boulevard, Harrison 7890
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The Reader Writes—

The Salesman in the Emergency

One of the most pressing problems facing chemical company executives in the present emergency is the role of the salesman. At the recent 20th anniversary meeting of the Salesmen's Association of the American Chemical Industry at Shawnee-on-the-Delaware, Ga., this absorbing subject was discussed in an open forum and several constructive ideas were advanced. Chemical Industries in a "Pulse of Opinion" presents the views of an additional group of well-known leaders.

ARTHUR J. CAMPBELL
General Sales Manager
American Cyanamid & Chemical Corp.

We have not contracted our sales force and do not contemplate such action, for although under present conditions there is increasingly less emphasis of the function of direct solicitation of business, we are placing correspondingly greater emphasis on customer service and the maintaining of good will.

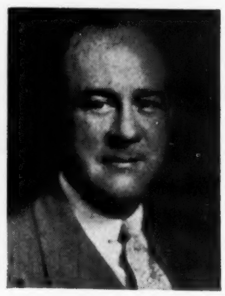
Arthur J. Campbell

In respect to those of our products which are not likely to be seriously affected by the Defense Program we are continuing our direct sales efforts with a view to developing such business as a cushion against the shrinkage in volume that can be expected when the Defense Program is liquidated.

As far as the scarce items are concerned, direct solicitation is avoided, but here our salesmen perform what is probably their most important function in these times, that of maintaining and building good will for the Corporation. As far as possible we have our salesmen handle directly with their customers cases of rejections and reductions in orders, as this permits the salesmen to be of service in possibly suggesting other sources or substitutes, and further to maintain good will by selling the customer the idea, which of course is supported by the facts, that we are doing our best to be absolutely fair in the necessary allocation of materials and that we are constantly striving to enhance our service by seeking new sources of raw materials and expanding our output as far as possible.

GEORGE S. COOPER
Vice-President
Diamond Alkali Co.

Yours of August 20th covers a subject that is foremost in everyone's mind who is associated with selling. I have given the matter a great deal of thought and I feel, personally, that now, more than at any other time, an intelligent sales staff is of inestimable value to any corporation.



George S. Cooper

It is true that the average company does not have to solicit business but it is necessary to examine all orders received most carefully to decide whether the materials ordered are actually needed, whether the customer is endeavoring to stock up or to speculate. The individuals best acquainted with the customers' affairs are the men who have been calling on them constantly for business in the past. It is difficult to turn down business from old friends or from companies who might be potential buyers at the end of the present emergency. There again, the knowledge and diplomacy of the men familiar with the companies in question is utilized. When it becomes necessary to forego business the manner in which the transaction is handled is most important. We strive to retain the good will of all our customers and we prefer to have the salesmen call directly upon the customer to explain the present situation rather than to write a letter which may be distasteful to the buyer and affect his business relations with us in the future. Naturally, the most experienced men can be of great assistance to our distributors and agents throughout the country.

Our business is becoming more closely associated with the Defense Program each day and our problems are increasing. Strange as it may seem, the personnel of our Sales Department are busier now than heretofore.

I believe it is imperative that there be as little dislocation as possible in a sales organization now if a company hopes to cope with the problems that may be presented at the termination of the existing emergency.

CHARLES P. GULICK
President
National Oil Products Co.

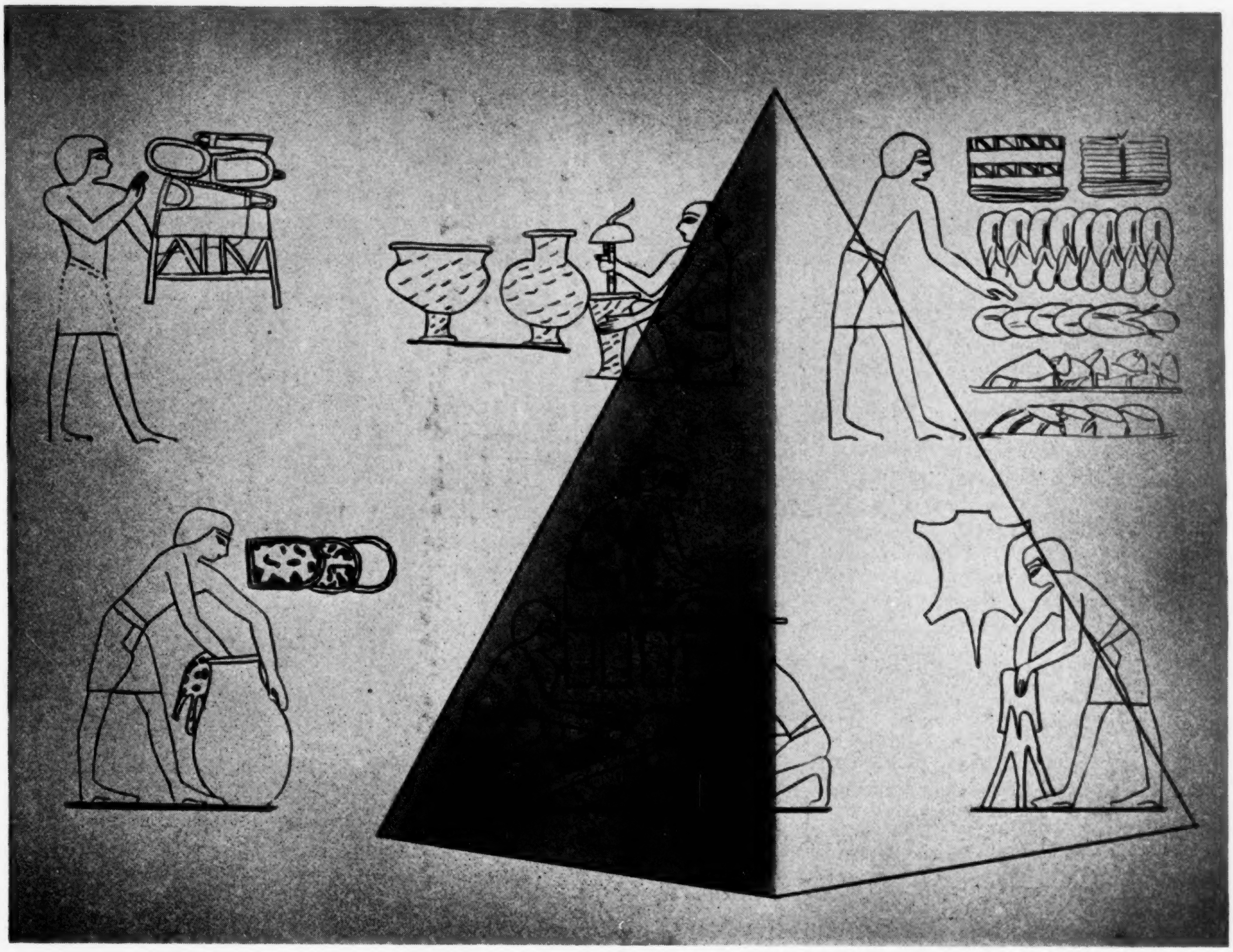
Under the National Defense Program where there is unprecedented demand for materials and great uncertainty as to supply because of priority orders, it is a logical question as to what should be the best plan of management covering sales staffs. In my opinion times like these make it necessary, in so far as possible, to re-educate the sales personnel into lines of service and diplomacy.

Charles P. Gulick

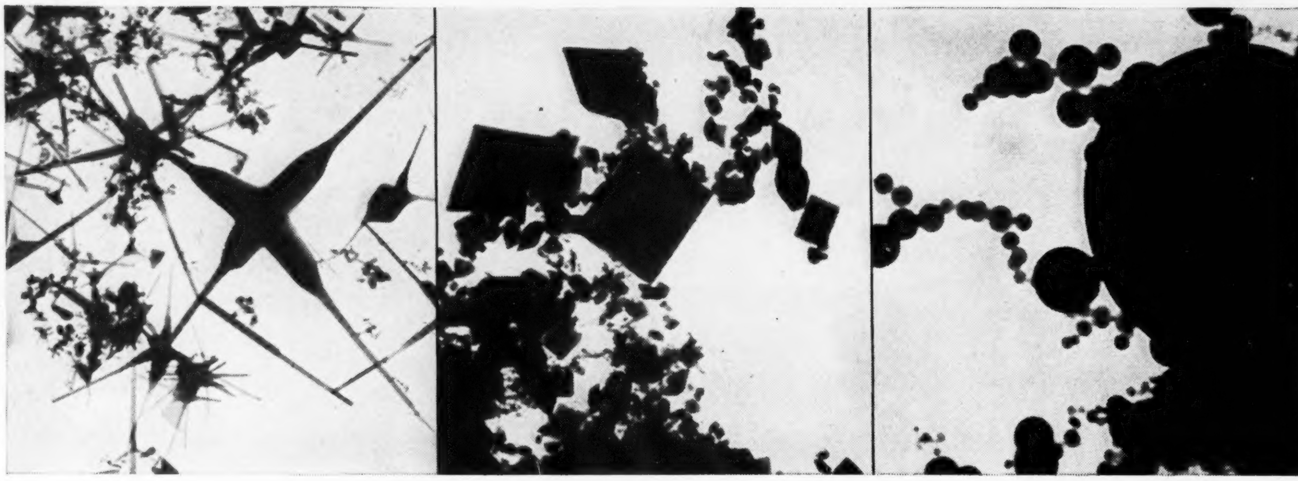
Now, more than ever, does management need to have at its finger tips the most accurate information regarding the activities of its customers in order to intelligently plan its production, distribution, purchasing and other operating activities. Since all of these activities must be coordinated in such a way as to place major emphasis upon National Defense and secondary emphasis on civilian supply, this can only be done with adequate and detailed information regarding the needs of industry.

This information can be obtained through the intelligent contact of sales people. Much of the information required must of necessity be of a confidential or semi-confidential nature. This can best be obtained through the avenues of human contact by the diplomats of industry—its sales staff. This re-education of the staff should not only enable one industry to serve other industries more efficiently, with due regard to the defense needs of the country, but it should lay the ground work for an improved efficiency in the aftermath of the war. This company is endeavoring to shape its course and policy in conformity with the philosophy herein outlined.

(Continued on page 428)



Life ON THE



(Above) **SMOKE HAS SHAPE.** That particles of smoke from burning metals possess definite and characteristic forms, in many instances crystalline, is demonstrated by these electron micrographs made at the Stamford Laboratories of the American Cyanamid Company. Magnification is 18,000 X. Zinc oxide smoke (left) is made from metallic zinc heated in an oxygen flame. Observe that the crystals appear to be growing like snowflakes. Tungsten oxide smoke (center) comprises crystals which vary greatly in size yet are invariably lozenge-shaped. Aluminum oxide smoke (right) consists of spheres, not crystals. Cyanamid research scientists utilize these smokes as test objects for determining the resolving power of the electron microscope.

(Below) **LAMPS FOR THE BLACKOUT** give sufficient light to facilitate flow of automobile and pedestrian traffic, remain invisible from the air. Lamp bulbs are filled with argon, give off ultra-violet rays, which can be used to activate fluorescent paints on sign posts, curbs, or even vehicles.

General Electric Photo

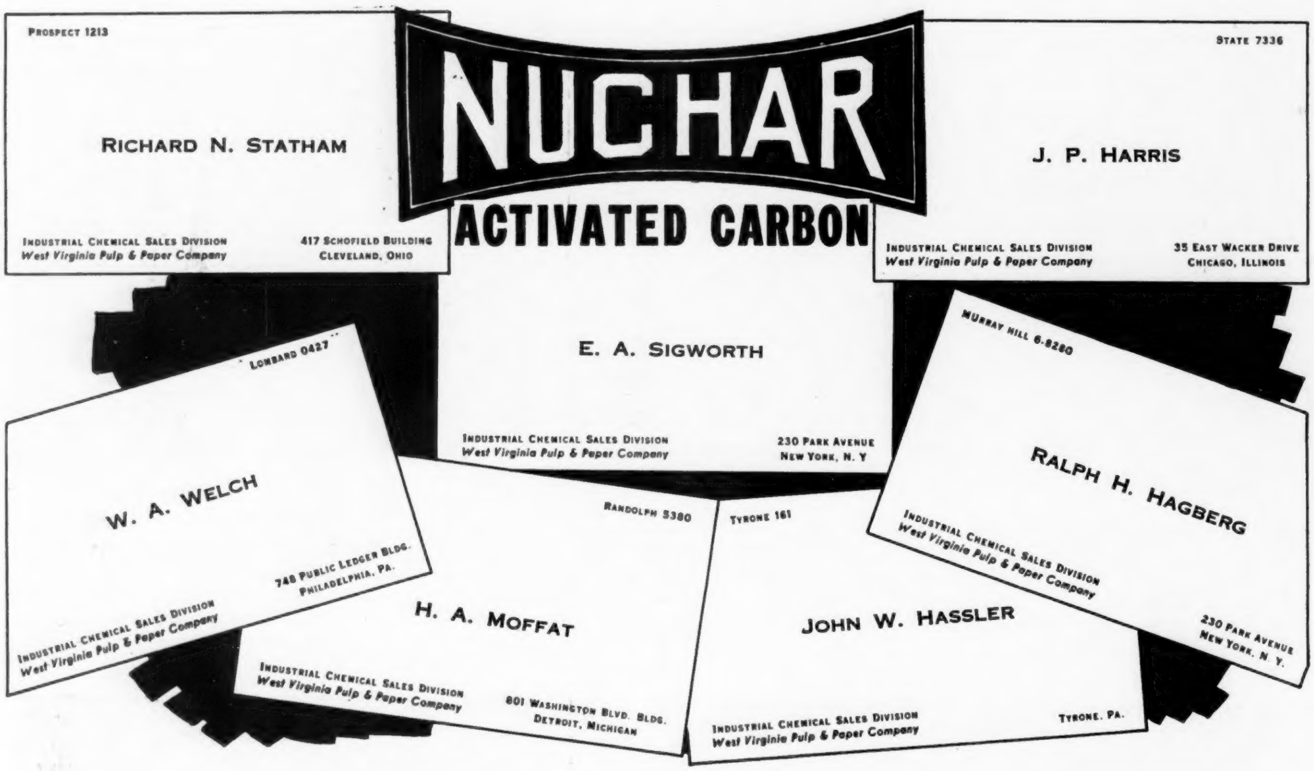
Westinghouse Photo

(Above) **INSTRUMENT DIALS STAY WHITE** when sprayed with a new liquid coating that offers high resistance to the discoloring effects of elevated temperatures, light, chemical fumes, and moisture. Coatings which retain their original color and luster, when they are exposed to conditions similar to those encountered by instrument dials, can be formulated with the aid of new resins derived from melamine, now being produced by Cyanamid on a commercial scale.

On Your Staff . . .

ADVERTISING PAGES REMOVED

BUT NOT ON YOUR PAYROLL



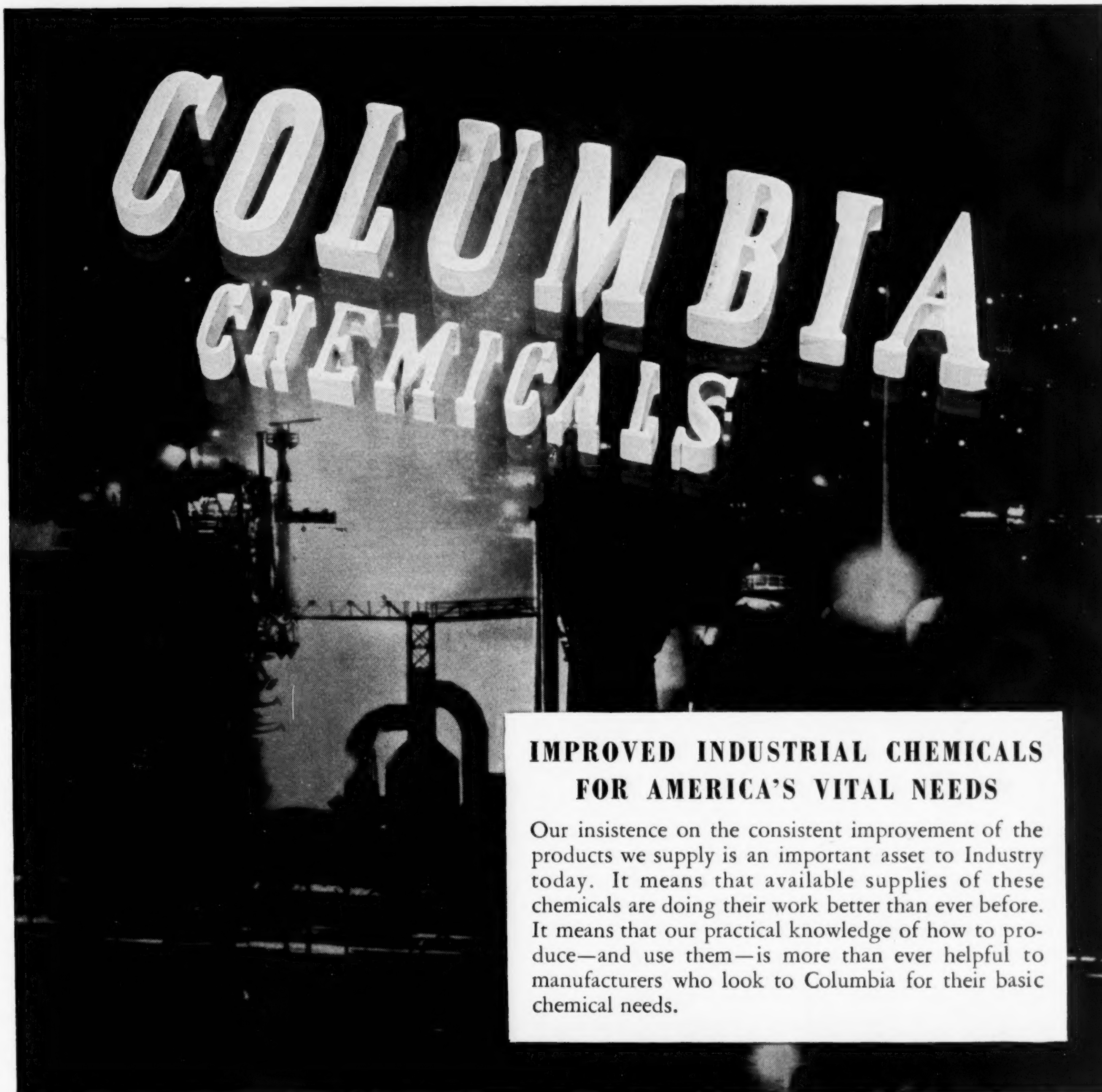
By writing to our nearest office you can add to your staff a group of purification technicians. They will study your purification problems in relation to your present equipment and production set-up; and will recommend the use of NUCHAR Activated Carbon only after exhaustive experiments have proved to you its superiority over older, costlier purification methods.

Remember, NUCHAR Activated Carbon is often adaptable for use in conjunction with other methods, enabling you to improve the quality standards of your products, frequently at a reduced operating cost.

INDUSTRIAL CHEMICAL SALES

DIVISION WEST VIRGINIA PULP AND PAPER COMPANY

NEW YORK	CHICAGO	PHILADELPHIA	CLEVELAND
230 Park Avenue	35 E. Wacker Drive	748 Public Ledger Bldg.	844 Leader Bldg.


COLUMBIA
CHEMICALS

THE READER WRITES

(*Continued from page 416*)

H. GORDON MACKELCAN
Vice-President in Charge of Sales
Innis, Speiden & Co.

I am glad to tell you the policy of this Company has been to keep its sales organization intact. We have not drawn in any of our men from the road and expect them to call regularly on the trade in order to keep up our contacts with our customers and to assist them in every way possible to get supplies in these difficult times.

Gordon MacKelcan

We know that the war will end some time and that the mad scramble to get out of taking orders today will reverse itself and we expect to be in there pitching when that time comes.

This is our 125th year. We are not doing any celebrating because we haven't the time, but having been in business that long it is reasonable to believe we will be on the job for a good many more years. We have passed through a lot of wars and a lot of depressions and we are drawing on our long and wide experience in the conduct of our business today.

Opinion of a High Official of an Alkali Company

The question of what to do with sales organizations during the present days is a problem for all of us. In our own particular business the problem is even more difficult, since we have several different types of sales organizations, each group selling a particular line of products. Our general policy is to continue calling on the trade by our sales representatives, even though it is impossible to solicit their business. On all Salt Company's products, we are behind on deliveries, in some cases as much as four months. Our reasons for the continued activity of our sales organization might be briefly summarized as follows:

1. We have spent many thousands of dollars in advertising and sales promotion plans to popularize the Salt Company's brands in the minds of the buying public.

2. We believe the buyer of chemicals, even though he cannot secure delivery, appreciates a word of explanation from the salesman who has been calling on him for many years.

3. Our sales representatives have been able to accomplish much in suggesting to the buyer ways of using smaller quantities of our product, or in some cases securing a substitute which will accomplish results.

4. We feel that to ask our sales representatives to withdraw from their sales activities would have a very harmful effect on the morale of the individuals involved. You can readily see that if a salesman was withdrawn from sales for a period of three to six months, or even longer, his sales effectiveness for the future would be materially lowered. It would be very much easier to keep our sales representatives "primed up" for the future by keeping them in the field than by keeping them at home.

In addition to the above, however, we have taken certain steps to make our sales organization of greater value to the company. A number of our sales representatives, technically-trained men, are being used in plant operation, although in every case this is only being done for short periods of time. The men involved will receive a greater knowledge of plant operation and even more, maybe the plant men will receive from the sales representatives, because of their very close contact, a greater appreciation of the sales difficulties confronting the company. We have found from actual experience that the plant appreciates more than ever before the peculiar problems facing the Sales Department.

Course of Study

In one of our sales divisions, we have instituted a course of study, under which the sales representatives will for a portion of their time be in the field working in the usual way with their trade, and for a portion of their time will be engaged in certain plant studies in the plant of their customer, who will give them a greater knowledge of the customer's needs. This we know will have a very healthy effect in making these representatives more familiar with the needs of their trade. Such a program is hard to put into effect during periods when the salesman is actively and aggressively engaged in getting orders but during the present emergency the sales representative has the time to learn more completely his customer's requirements. Our sales representatives understand that the company is not seeking ways to eliminate them from their jobs but rather to have them so familiar with their sales territory and needs that they will be of even greater value and service to their customers in the future.

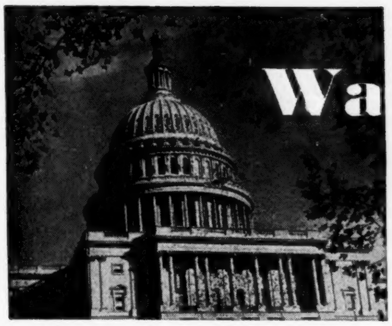
R. A. CLARK
Sales Manager
J. T. Baker Chemical Co.

I have no hesitation in expressing my views to you regarding the importance of sales solicitation today. The attached advertisement which we have used in your publication, as well as other publications, is our foundation.

Since we accept the general proposition that we are operating in a seller's market, sales solicitation today is just as important as it ever was. We believe that we are passing through a very critical stage in our business history. We have the opportunity of establishing many lasting relationships if we handle the present situation properly. Since this is a fact, a salesman or field representative must act as a liaison between his home office and the customer. He must interpret his company's ability to supply, or lack of ability to supply, the materials needed by the customer, and he must interpret to his Company the needs of his customer.

We, therefore, expect to continue our sales activity as vigorously as ever.

Pictured above are the participants in the symposium at the Salesmen's Association of the American Chemical Industry 20th anniversary celebration at Shawnee-on-the-Delaware last month. Devoted to "The Functions of the Chemical Salesman During the Present Emergency," symposium featured many questions and answers clarifying the salesman's position. Left to right, Ralph E. Dorland, Dow Chemical; Frank McDonough, President, New York Quinine & Chemical; E. A. Orem, DuPont; Thomas R. Farrell, Drug & Cosmetic Industry; Robert J. Quinn, Mathieson; and Robert J. Gould, Heyden Chemical.



Washington

By

T. N. SANDIFER

THERE is a decided and relatively sudden disposition apparent in Washington to take second thought about matters that only a few weeks ago, might have been rushed through the departmental or legislative mill and sprung on a country that had little previous warning of what was coming.

Thus the House, which had deliberately slowed down its consideration of the highly controversial Price Control bill last month, demonstrated it was still in a deliberate mood by postponing its resumption of activities from the scheduled September 15 to October 6.

T. N. Sandifer

On Price Control the House Committee having this measure for consideration has evinced a determination to continue to take its time. In this connection, proponents of the legislation have made so little headway that the United States Chamber of Commerce is now circulating a questionnaire among its own membership on the proposition that an entirely new, and much modified bill on the subject should be drafted and introduced.

The House remained at this writing, equally obdurate on the Property Requisition bill which has been in conference between House and Senate, and already much modified.

However, the big subject in Washington, as doubtless over the country, is taxes. The proposal of Secretary of Treasury Morgenthau for a profits-curb limiting profits to 6 per cent. aroused outright resentment at the Capitol on both sides of the Congress, which was freely expressed despite the understanding here that the President concurs in the idea.

In the Senate the chairman of the Senate Finance Committee, Senator George, of Georgia, Democrat, commented pointedly that the Treasury Department has twice since last year advocated an excess profits tax based solely on invested capital, and both times Congress had rejected the idea, and would act similarly again if the country saw the matter in its proper light.

In the House, the members that have just finished a disagreeable job in the tax law now just taking hold on the public are openly not in a mood for any such drastic proposal at this time. It should be borne in mind, however, that an international situation as fluid as it is at present in its involvement of the United States could become an important factor in a decision on this proposal.

The Treasury has just put into limited circulation a tentative draft of a codification of internal revenue laws, statutes and regulations that has been in preparation for the past four years, which is intended to modernize some older laws in their administration, and otherwise clear away extraneous matter that had no present bearing on today's economics.

There is strong indication that after comments have been received from those who have studied the draft, it will be embodied in legislation that will be offered to Congress by the Treasury in the coming Fall or perhaps later months. Copies are available from the Collector of Internal Revenue, Treasury Department, to interested parties.

As further evidence that Washington is taking second thought on various matters a very striking development is in progress at OPM, or rather, SPAB, where the increasing dissatisfaction with Priorities as it has been administered is being met with a gradual shift of emphasis to allocations of critical or scarce materials. This will be more evident later in the month, as the plan assumes shape.

This does not mean that a program of detailed allocations is going to replace the Priorities system, but it does foreshadow, in the opinion of qualified students of the matter here and in industry, a more liberal allocation of needed raw materials, especially to smaller concerns. The Compliance and Field Service Section of OPM together with several hundred field offices of various Federal agencies, is now gathering data among both defense and non-defense plants on both compliance with priority regulations, and on material supplies and their use.

The best illustration of the contemplated plan to stress allocations was given the writer by an OPM expert who cited a theoretical case in which all concerns of a given industry were on defense work, had equal priority ratings, and all clamoring for necessary allotments of scare materials. Obviously the choice would be those plants which were shortest on the needed raw materials, rather than those perhaps behind in production, and with large stockpiles of material at hand.

Meanwhile, somewhat alarmed at too optimistic interpretations of his position before a Senate committee on this matter, Donald Nelson, Director of Priorities and incidentally, key man at SPAB, warned that priorities would be strictly enforced, with penalties.

Nevertheless, the plan has become known sufficiently to harassed industrialists to hold out to them more hope than they have had for some time, and there is a decidedly better atmosphere at OPM itself. While observers still feel it is too early to make a judgment, the feeling about Nelson himself is much better among businessmen and industry. There is a belief that he is showing more strength than it was first thought anyone in his position could get away with, and some of it has been thrown to the side of the smaller concerns.

This new energy may, by the time this appears, have produced the Chemicals Order which for some time has been shifting about the desks of various officials at OPM, OPA, and others. It was apparently nearing issue at one stage late in September, but was again delayed. A parallel case, however, is seen in the Utilities Order which was finally issued after at least two false starts and months of deferment on one ground and another.

The Chemicals Order, about which little is known as yet, will of course influence the outlook in the industry decidedly. Meanwhile, at intervals, since Nelson has been in control, details are occasionally caught up and straightened out. Thus, relating to some misunderstanding among research laboratories as to the proper procedure in obtaining the A-2 preference rating assigned to deliveries of certain materials and equipment in their field, it has been explained that all applications should be filed on PD-88, and directed to the Chemical Branch OPM, Washington, and not to the National Academy of Sciences, or other bodies, as some have thought.

Further, it has been authorized that persons who wish to use form PD-1, the standard form of application for ratings,

(Continued on Page 486)

Let Us Keep the Public Properly Informed

A LITTLE more than a year ago the chemical industry of this country was pointing with justifiable pride to its ability to meet all possible emergencies that might conceivably arise in connection with the defense program. Today it is apparent that in many of the industry's ramificatons it is seriously under-built and under-equipped. Has management been guilty of a grave mistake in under-estimating the requirements of an all-out war economy. The answer is definitely no!

Only within the past few months has it been clearly indicated that American chemical industry must shoulder much of the burdens of production of England and her allies and to supply at the same time the greatly enlarged requirements of the Dutch East Indies, China, South America and now Russia—markets, by the way, that normally we were but very slightly interested in serving.

No one as we see it is to blame and certainly there should be no attempt to fasten any stigma on the capable management directing American chemical enterprises.

All evidence points to the fact that our War Department in twenty years of planning for "M-Day" did not visualize even remotely a chain of circumstances such as the sudden and complete collapse of France, the serious threat to the freedom of the sea lanes and the passage of a Lend-Lease Bill. We doubt that such possibilities were seriously studied or discussed and we do not see how our Army officials can be condemned or accused of laxity.

For the time being at least it is certain that chemical-wise America must pull in the belt several more notches. Non-defense industries consuming chemicals are going to find supplies more and more difficult to obtain. The situation is bound to get considerably worse before it improves. The general public is going to become conscious of these shortages and will inevitably question why they exist. The layman already is acquainted with the fact that he may not get his pet anti-freeze this winter and that his dry-cleaner may not be able to take the spots off his vest. His wife may soon wonder why her laundry has become addicted to turning out perfect examples of "tattle-tale gray."

Today American chemical industry is experiencing war regimentation to a degree greater perhaps than any other single industry. One need only to check the ever-increasing list of chemicals under price control or to compare the War Department's critical and strategic lists of two years ago with the present group of chemicals, metals, minerals and ores now on full mandatory priority to perceive what a change has taken place. Even the layman begins to comprehend the full significance of the revision of production plans when he is told, for example, that output of magnesium is to be increased from ten million pounds annually to 400 million pounds, aluminum from 400 million pounds to one and one-half billion pounds or more and toluol from some 25 million gallons to 70 million gallons.

American chemical manufacturers are not wasting precious time in recriminations. They are cheerfully accepting the continuous upward revisions of production schedules and will give an excellent account of their stewardship. But they do deserve to be treated fairly and squarely in the presentation of facts to the American public through the medium of the press of the nation.

Some of our nationally-known magazines and newspapers are unwittingly playing into the hands of a group who are resorting to smear tactics for purely selfish reasons or who are seemingly seeking to revise in a period of grave national emergency the basic and long-established pattern of the American way of life. Let us try indictments in the courts established by law rather than in magazine articles. In all friendliness we suggest to the general press that it make a more diligent effort to separate the wheat from the chaff, the truth from the untruth or half-truth, the innocent from the guilty. Technical information should be checked by competent authorities before it is published. Let us not sit idly by while an entire industry in placed in a false light because of the possible sins of a few. The public is entitled to know the truth, of course, but there is a vast difference between true facts and subtle propaganda. The general public may not recognize the difference but editors should or they should not be editors.

CHEMICAL INDUSTRIES

CI

The Chemical Business Magazine. Established 1914

CI EDITORIAL

Walter J. Murphy, Editor

The Threat To Professional Status: With the attention of the entire industry centered on the controversial subject of unionization of chemists and chemical engineers, the following news release received from the International Federation of Architects, Engineers, Chemists & Technicians, a C. I. O. affiliate, and branded by Representative Martin Dies as being completely dominated by the Communist Party, is of special interest:

"In a message of greeting to be delivered to the Sixth National Convention of the Federation of Architects Engineers, Chemists & Technicians, (FAECT CIO affiliate), President Franklin D. Roosevelt stressed the importance of the convention meeting 'At a time of grave crisis in our national affairs.'

"The FAECT which will hold its convention in Detroit, Michigan, on October 10, 11 and 12, is a union of technical employees, the great majority of whom are employed in national defense industries. The President's message to Lewis Alan Berne, International President of the FAECT, reads as follows:

September 17, 1941.

'THE WHITE HOUSE
WASHINGTON

Dear Mr. Berne:

The Sixth National Convention of the International Federation of Architects, Engineers, Chemists and Technicians meets at a time of grave crisis in our national affairs. The many and varied skills which the members of the Federation command are a national asset of incalculable value. In extending hearty greetings to the convention, I do so in full confidence that the immense resources of the Federation will be a reserve of unfailing strength to the nation in the great work of providing for the national defense.

Very sincerely yours,
(signed) Franklin D. Roosevelt'

"The FAECT has experienced considerable growth during the past year particularly in the auto and aircraft industries. It now has signed contracts with such leading manufacturers as General Motors, Chrysler Corporation, Briggs, Murray Body, Packard Motor Car, Shell Oil Company, Vultee Aircraft, Chicago Apparatus, Solar Manufacturing Corporation, and others. The most recent achievement of the FAECT has been that of organization of more than 1,000 technical employees at the Ford Motor Company.

"In view of the fact that a large proportion of its membership is employed in the defense industries, the union's convention will devote a number of conferences and panels to the subject of the technical man's contribution to national defense. The convention plans to issue a report outlining the subject in discussion and proposing ways and means of speeding up national defense production."

We congratulate the FAECT on one point and one point alone—its cleverness in obtaining a message of hearty greeting from the President. We have attended as part of our duties as editor a great many meetings of the American Chemical Society, the American Institute of Chemical Engineers, the American Institute of Chemists, and other scientific and industrial groups of the industry and do not recall that they have been so singularly honored. Possibly the officers of these organizations have been lax in not asking for a White House blessing to publicize.

Those who really know the complete story are not likely to be duped into believing that the FAECT in convention assembled represents the graduate chemists and chemical engineers of this country. It is now long last becoming evident that the policy of this radical group is to herd a heterogeneous group of professional men and technicians in which, of course, the former will be greatly outnumbered, into a union with C. I. O. walking delegates dictating such important subjects as wages, hours of work, conditions of employment, etc. The sheer audacity of this group "proposing ways and means of speeding up national defense production" would be amusing were we not in a period of truly great national emergency. The most concrete contribution that this or any other labor union group can make now is to lend weight to stopping the senseless and devastating jurisdictional strikes that are plaguing industry and delaying our defense program. As this is being written one of the largest, if not the largest chemical plant in the State of New Jersey, is shut tight because the C. I. O. disputes the right of the A. F. of L. to act as the bargaining agent with the company, and plant officials are being barred from entering the plant they direct by a picket line of plant workers.

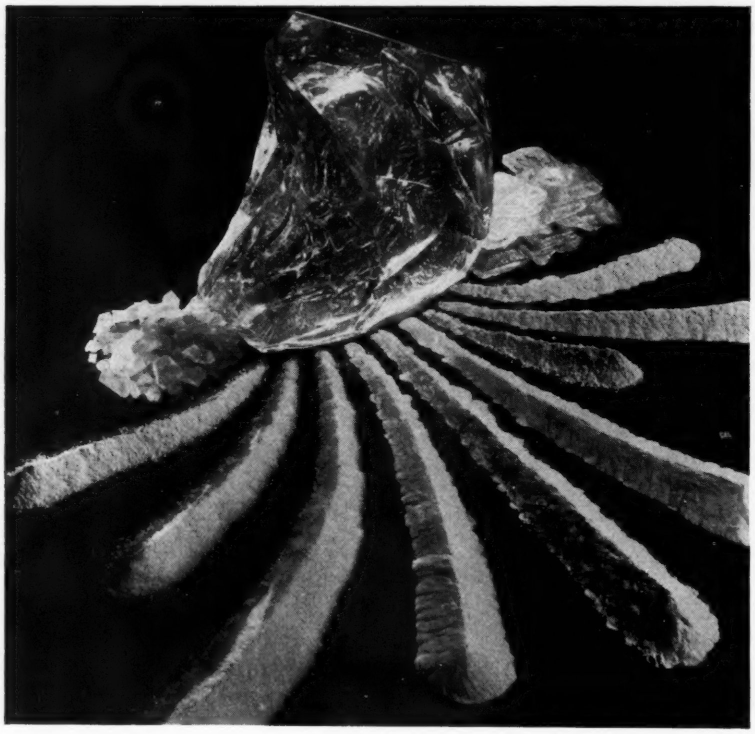
Insofar as graduate chemists and chemical engineers are concerned, the issue is now crystal clear. The question of a professional status versus a union status is no longer simply an interesting subject for debate at a college or university chemical society meeting. Labor legislation including such laws as the Wagner Act, the Wages and Hours Act places powerful weapons in the hands of those who wish to push unionizing activities into the professional fields. Is there still any who believe that such levers will not now be utilized to the fullest extent possible?

We applaud that part of the recent statement of the Board of Directors of the American Chemical Society which states that the Society is unalterably opposed to the forcible inclusion of professional men in bargaining units dominated and controlled by nonprofessional employees, whether that inclusion be brought about by economic pressure upon an employer, by intimidation of the professional employee, or by operation of either state or federal law, but we believe the Society is definitely on unsound ground when it attempts to suggest minimum starting salaries and to include such salary suggestions as one of several qualifications for determining and defining "professional" status as opposed to "chemical internship."

Such action is simply playing into the hands of those who would unionize graduate chemists and engineers. It is meeting the issue on the most vulnerable ground imaginable for the unions will not hesitate to "up" any wage scale that the A. C. S. may suggest, and will not be backward in promising "the world with a fence around it."

Again we hold with the stand taken by the A. C. S. Board of Directors calling to the attention of all employers that intelligent and enlightened management

(Continued on page 526)



The Properties of Soluble Silicates

In Two Parts: Part One
By C. H. Jeglum
Philadelphia Quartz Co.

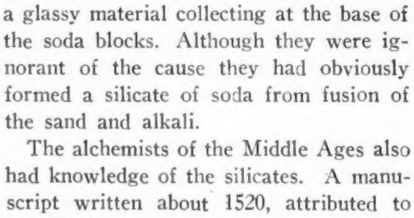
Ninety-nine out of a hundred people who are puzzled by the phrase "silicate of soda" will brighten and remark "Oh yes, for preserving eggs!" when they are told that "water-glass" is synonymous. In view of the once widespread use of waterglass for this purpose it is perhaps not surprising that silicate of soda should be recognized by the average individual in this way. Indeed, it is about the only use for silicate in which the ultimate consumer is directly involved but, as we shall see, the channels through which silicates enter his life indirectly are almost numberless.

"SILICATES of soda" is a generic term. While there are several grades which are entirely suitable for egg-preserving there are many others which would not serve at all. The reason will become obvious when we discuss the composition of this versatile series of chemicals.

But first, just a little history.

Although silicate of soda was not made in the United States until 1857 it is by no means a modern invention. The earliest reference to it appears in the great Naturalis Historia of Pliny the Elder. Among the 20,000 facts which he states are recorded therein is the account of the Phoenician sailors[1] who one day cooked their supper over a beach fire. They used chunks of natural soda to support their cooking vessels and were surprised to find a glassy material collecting at the base of the soda blocks. Although they were ignorant of the cause they had obviously formed a silicate of soda from fusion of the sand and alkali.

The alchemists of the Middle Ages also had knowledge of the silicates. A manuscript written about 1520, attributed to Basil Valentine, tells how to prepare it by fusion of silica and sal tartari.[2] This author suggested its use for making building stone and for artificially petrifying wood. Agricola (Georg Bauer) mentions silicate of potash in De Re Metallica.[3] But it was von Fuchs,[4] in 1818 who rediscovered the soluble silicates and studied them at considerable length. He, it was, who first suggested their use in cements, paints, detergents and textile processes.



Sodium silicate glass. Top photo shows solid silicates; lump glass, crystals, granules, hydrated and anhydrous powders. (Phila. Quartz Photos)

In spite of von Fuchs' enthusiasm it was not until another fifty years had passed that extensive commercial use was made of these products. The exact dates do not appear in the record but by 1862 the firm of W. Gossage and Son of Widnes, England was selling a soap at the rate of 60 tons per week, said to contain 30 per cent. of a 20° Baume' silicate solution. On the Continent also, silicate was being used in soap at this time.

In the United States the war between the North and the South had shut off all trade in rosin, and northern soap manufacturers were hard pressed for a suitable substitute. The Philadelphia firm of Joseph S. and Thomas Elkinton had the answer. As progressive soap manufacturers they had studied foreign publications, learned of the usefulness of sodium silicate and, in 1857, they began making it for their own use.[5] According to their ledger they made the first recorded sale on "First Month, 21, 1861 to D. G. Scott, 3 barrels of silicate, $33.60." Other customers came, and presently the tail wagged the dog. In 1864 Joseph S. and brother Thomas Elkinton with John Greacen, Jr.

and Samuel Booth formed the Philadelphia Quartz Company for the manufacture of this new chemical. (The manufacture of soap was continued at another location by the old firm of Jos. S. and Thos. Elkinton.) The silicate business grew slowly, but as new uses were found tonnage increased until today the industry produces well over a billion pounds annually.[6]

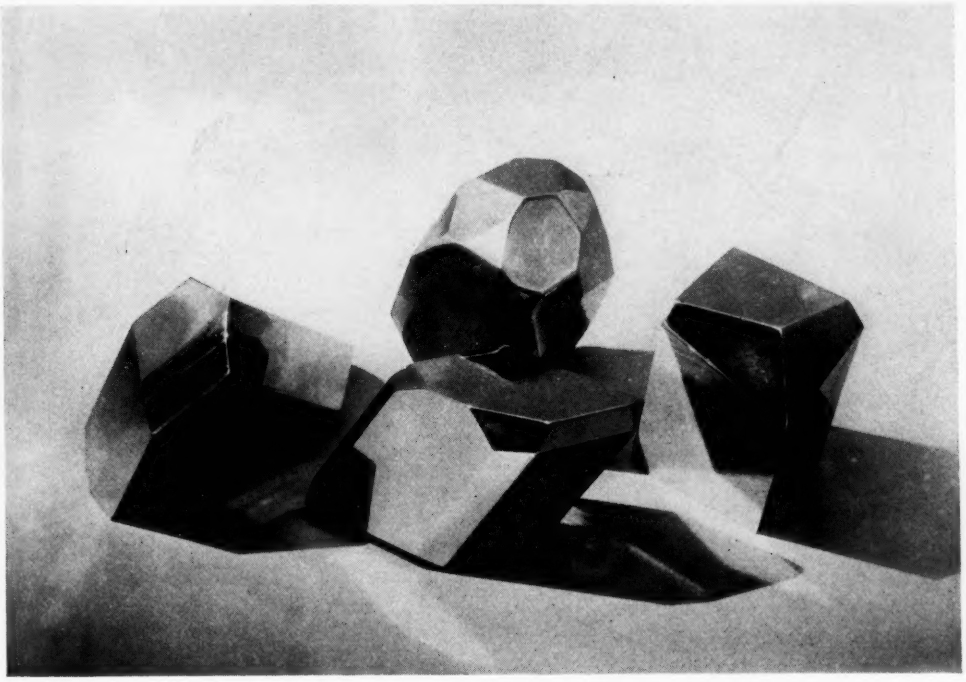
Manufacture

Silicate of soda is a very low-priced commodity, and because it is relatively heavy the freight on long hauls can easily amount to more than the cost of the material itself. Consequently it is common practice for the manufacturers to build their producing units in the vicinity of large consumers. In some cases delivery is made by pipe line.

The process by which the soluble silicates are made is not complicated but like many other procedures which are simple in theory, failure to observe a thousand and one details results in a product which is all but unusable. The usual practice consists of melting sand and soda ash in an open hearth regenerative furnace built of refractory brick. Temperatures of 1300°C to 1500°C are common. The melt runs into iron molds on an endless chain where it freezes to a glass. A more common alternative is to put it directly into solution by running the molten material into a rotary dissolver containing steam and hot water. This liquid may in turn be spray dried to yield quickly-soluble hydrated powders.

The silica used in the process is of even greater purity than is required in glass manufacture. An SiO_2 content of 99 per cent + is usually demanded. The percentage of calcia and magnesia must be watched carefully as an excess of either would affect the solubility of the glass. Iron and alumina are also kept under close control. Fortunately there are a number of suppliers throughout the country who are equipped to wash and table the natural sands of New Jersey, Pennsylvania, West Virginia and the Middle Western Ottawa sands, to meet the strict requirements of the sodium silicate manufacturers.

Contrary to the belief of many who are only casually informed there is no coal or other form of carbon directly used in the manufacture of sodium silicates. The false assumption that carbon is so used probably carries over from the early days when sodium sulfate was the source of alkali, and carbon was necessary to reduce it. The process has long since been abandoned in this country but nevertheless many textbooks continue to mention carbon as a basic ingredient of the soluble silicates.



Models of the four different hydrates of sodium metasilicate.

Characteristics

A few paragraphs back we referred to the term "silicate of soda" as generic. It is definitely that. Suppose representative samples of silicate were handed, one each, to several individuals who were asked to make brief statements regarding their observation. The first might say: "I see from this sample that silicate of soda is a thin, slightly sticky fluid of the consistency of maple syrup."

"Not at all," says the next observer. "From examining my sample it is perfectly plain that silicate of soda is a heavy viscous material much slower than 'molasses in January' in its rate of flow."

"But that can't be," interrupts number three. "The sample I hold is a white gritty powder which does not dissolve even in boiling water."

"You must be wrong," says number four. "My sample is also a white powder but it dissolves easily in hot water, and in cold water too."

"I don't know what you can be thinking of," is the next statement. "Silicate of soda is a soft plastic mass which bounces like rubber."

"Silicate is plastic but it certainly doesn't bounce," says another. "It is sticky to touch and it pulls out like old-fashioned taffy."

"What a batch of dumb-bells!" mutters the last observer to himself as he walks away with a lump of green transparent glass. If he isn't careful he will cut his hand on its sharp edges.

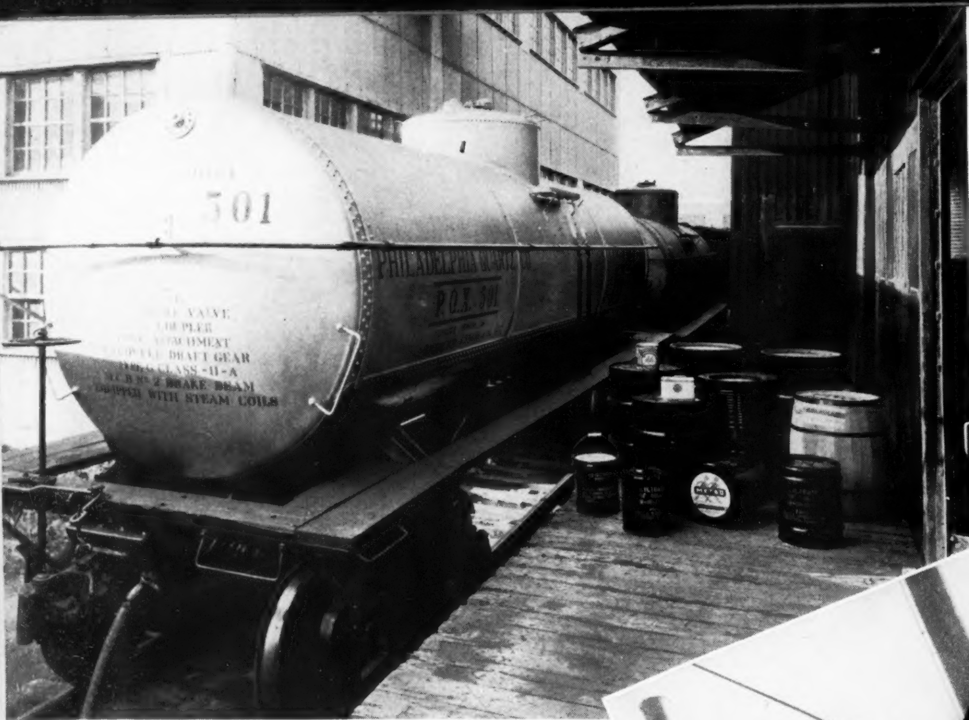
It is another case of the blind men and the elephant,[7] where

> " . . . each was partly in the right,
> And all were in the wrong."

There are sodium silicates which exhibit the characteristics described by our imaginary observers but there is no one silicate which shows them all. The differences, as we shall see, are due entirely to the proportion of alkali to silica which each contains and to the amount of water present.

Theoretically one could make a silicate by combining a trace of alkali with a preponderance of silica but it would take an oxy-hydrogen flame to fuse the mixture and the result would certainly not be a soluble glass. From this extreme one could go through more reasonable proportions of high silica and low alkali to mixtures high in alkali and low in silica until one reached the final limit of caustic soda with a trace of silica. Actually, of course, there are practical boundaries within which the commercial silicates will fall. On the side of high alkali, is the so-called orthosilicate which contains two parts of alkali (Na_2O) to one of silica (SiO_2). The limit on the side of high silica is one mole of soda to 3.9 moles of silica.

Before we discuss the silicates individually a word about formulae is not out of place. In a very few cases the silicates are definite chemical salts and the formula may be written as such. Metasilicate, for instance, is properly designated as Na_2SiO_3. For the most part, however, the silicates are loosely joined combinations of alkali and silica and the formula must be written to show this. Where a writer



Left, various packages used for shipment of silicate of soda (plus a tank car). Below, filling a tank car with silicate of soda. *(Phila. Quartz Photos)*

refers to a silicate carrying one mole of soda and three of silica the formula should be written $Na_2O.3SiO_2$. It would be incorrect to write it as $Na_2Si_3O_7$ because a definite chemical salt of this composition is not known to exist.

One further word about ratio. Since a molecule of Na_2O weighs very nearly the same as a molecule of SiO_2 the molecular ratio and percentage ratio are very nearly equal. Consequently it has become standard practice to use percentage ratio for all grades of sodium silicate more siliceous than the metasilicate. In the case of potassium silicate the molecular weights of alkali and silica are so unlike that it is necessary to calculate the molecular ratio.

Grades

The most siliceous silicate on the market is $Na_2O.3.9\ SiO_2$. It is sold as a liquid at a specific gravity of 1.300 and carries about 31 per cent. solids (6.3% Na_2O plus 24.6% SiO_2). The viscosity is approximately 2.6 poises which means that the solution has about the same consistency as good maple syrup.

To the uninformed such a solution seems very thin and watery for a commercial liquid but the viscosity of highly siliceous silicates is very sensitive to concentration. The removal of sufficient water to leave about 35 per cent. solids will convert it to a semi-solid with very interesting characteristics. It can be shaped into a ball by rolling a lump in the hands. Such a ball is surprisingly resilient; it will bounce in lively fashion when dropped on a hard surface. If crushed it will crumble to particles not unlike crumbs left after using an art-gum eraser, but these crumbs can be molded together again. If instead of crushing, the ball is broken by a quick motion of the hands, it separates into two pieces with a conchoidal fracture typical of vitreous systems.

The 1:3.9 solution finds its chief use as a binder in cements. It has some adhesive uses but sets so rapidly that it is difficult to control on a machine.

The next step in the series of commercial silicates takes us to $Na_2O.3.2SiO_2$ which is the ratio most widely used industrially. A 41° Be' liquid of this ratio is sold under the trade name of "N" Brand and because of its many uses it is sometimes facetiously referred to as "N for anything." This is not literally true of course. It would not be recommended as a binder for abrasive wheels nor for preventing corrosion in acidic mine waters, but it is used for such diverse purposes as deflocculating clay, bonding the individual layers of paper in corrugated board, hardening concrete, depressing gangue in ore flotation, and improving detergent action of laundry soap.

The anhydrous glass from which this liquid is made contains about 24 per cent. Na_2O and 76 per cent. SiO_2. It is clear, transparent and green in color (from traces of iron). It is practically insoluble by ordinary means and may be boiled in water for days without going into solution although alkali will slowly leach out. However, if exposed to steam under pressure silicate glasses dissolve readily. In cases where long freight hauls make delivery costs of liquid silicate prohibitive, such a glass may be put into solution by special dissolving apparatus at the user's plant.

Anhydrous silicate glass is also sold in the form of a powder for use in acid-resistant enamels. Since the alkali and silica have been once fused it can be substituted for raw ingredients in enamel formulae and results in a lower firing temperature with corresponding decreased operating costs.

Table I

% Ratio	Na_2O	SiO_2	H_2O	Viscosity Poises	Sp. G.	Baume'	pH of concentrated solution
1:3.90	6.3	24.6	69.1	2.6	1.300	33.5°	10.85
1:3.22	23.5	75.7	...	anhydrous glass, lump and powder			
1:3.22	19.5	63.0	17.5	hydrated powder			
1:3.22	8.9	28.7	62.4	1.8	1.394	41.0	
1:3.22	9.2	29.5	61.3	4.0	1.410	42.2	
1:3.22	9.3	30.1	60.6	7.5	1.422	43.0	
1:3.22	9.4	30.3	60.3	11.1	1.427	43.4	11.3
1:2.90	11.0	31.9	57.1	9.6	1.480	47.0	11.5
1:2.50	10.5	26.3	63.2	0.5	1.408	42.0	11.7
1:2.40	13.8	33.1	53.1	17.0	1.559	52.0	11.9
1:2.00	33.0	66.0	...	anhydrous glass, lump and powder			
1:2.00	27.5	55.0	17.5	hydrated powder			
1:2.00	14.5	29.0	56.5	2.8	1.526	50.0	
1:2.00	18.0	36.0	46.0	700	1.692	59.3	12.2
1:1.60	19.5	31.2	49.3	70	1.676	58.5	
1:1.60	24.2	38.7	37.1	587,000	1.871	67.5	12.8

The liquids of this ratio are available at various concentrations. The grade commonly referred to as waterglass is usually sold at 1.39 Sp.G., or to use the more common expression, 41° Baume'. A 42 solution is also a standard commercial grade and the liquid can be concentrated to about 1.43 Sp.G. (43.4° Be') at which point it carries nearly 40 per cent. solids.

The 1:3.2 ratio silicate is also available in the form of hydrated powders made by spray-drying the liquid to a state where it contains about 17 per cent. water. It is interesting that hydration enables the powder to dissolve quickly in hot water, more slowly in cold water. Because of its ready solubility, such a powder is useful as a binder in cold water cements and paints.

The most alkaline of the grades commonly referred to as "the adhesive silicates" has a ratio of 1:2.90 and is sold at a specific gravity of 1.480 (47° Be'); the viscosity is 9.6 poises. It is a very sticky material which dries relatively slowly, and for that reason is especially useful for sealing paper boxes where the surfaces are not always brought into contact immediately after the adhesive is spread.

During the days when silk weighting was an important industry, great quantities of a 1:2.50 silicate were used for fixing the tin-phosphate mixture onto the fibers. The practice is no longer important but this silicate is still used in various textile processes. It is a solution of crystal clarity and is sold at a specific gravity of 1.408 which is far below the possible concentration limit for this ratio.

The silicates containing a relatively large proportion of alkali to silica are not much used for adhesives because they dry out slowly and in some cases incompletely. They are, however, very useful as binders in cements. A grade such as 1:2.40 which is sold at a Sp.G. of 1.559 (52.0° Be') is typical. It is widely used in refractory cements.

At ratio 1:2.00 we come to another group of silicates available in the form of liquids, anhydrous glass, anhydrous powder, and hydrated powder. The liquid can be obtained in at least two different concentrations, namely Sp.G. 1.526 (50° Be') and 1.692 (59.3°). The latter grade is heavy and at room temperature has a viscosity of 700 poises—somewhat greater than thick molasses. It, like the 1:2.40 grade, is used in cements and it also finds use as a binder in abrasive wheels.

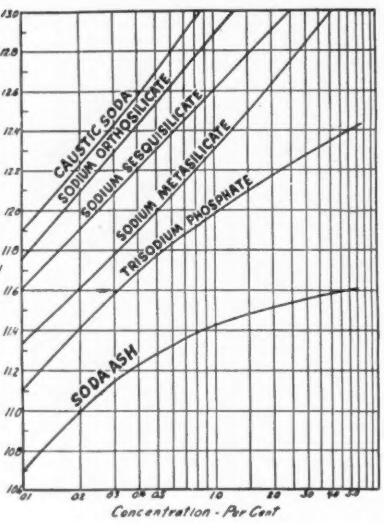
The most alkaline of the liquid silicates has a ratio of 1:1.60. One common grade in this series is sold at a concentration of Sp.G. 1.676 (58.5° Be'), but the maximum gravity at which it is available is 1.871 (67.5° Be'). Such a silicate appears at first glance, to be a solid but is really a liquid as can be shown by placing a "stick" of it across two supports and watching the center portion slowly sag. When warmed it flows with sufficient speed to handle satisfactorily but at 20°C. it is very near to being a "solid solution" —the viscosity is rated at 587,000 poises. One of the peculiar characteristics of this very concentrated silicate is that a lump of it can be pulled out to arms length like old fashioned taffy, but if chilled and struck sharply with a hammer it will break in pieces like a glass.

In the "taffy" state it is very sticky, as one audience learned to its amusement when a lump of well-pulled material got loose in a group of Boy Scouts who were fortunately stripped to summer-camp attire. They compared the taffy and bouncing-ball silicates by throwing pieces around the room and in the excitement the sticky stuff literally "got in the hair" of more than one lad. Warm showers remedied the difficulty with no harm done and, one may hope, with a lesson in silicate chemistry well learned. They may also have learned, incidentally, that silicates are effective dirt removers, but it is not common practice to use it for that purpose in quite so direct a fashion as was necessary in the particular case referred to.

Potassium silicate should also be mentioned here. In most respects it behaves very similarly to sodium silicate of the same ratio but there are some special cases where the higher cost for a potassium salt is justified. As a binder for carbon arc pencils where the yellow sodium flame is objectionable for instance, and in special paints and coatings where freedom from efflorescence is important, potassium silicate has a useful function. It is made in only one ratio (1:3.90 molecular). The solution is sold at 1.250 Sp.G. (29° Be') and at that concentration it contains 7.8 per cent. K_2O and 19.5 per cent. SiO_2; the viscosity is 0.4 poises. A solution of Sp.G. 1.295 (33° Be') is also available.

Before going on to the highly alkaline silicates it may be interesting to look at Table I which summarizes the data on the colloidal silicates commercially available. The composition figures are average values for commercial grades. No allowance has been made for impurities which will average 0.2 per cent. to 0.3 per cent. and will lower the water content by that amount. The impurities in silicates are almost always low because bivalent and polyvalent metal ions are largely precipitated out as complex silicates. A typical analysis of the impurities in a sodium silicate solution is given in Table II. It

Below, a modern silicate of soda factory.



The pH of various alkali solutions charted according to percent concentration

Figure 1.

is interesting to know that the amount of impurities is practically the same regardless of ratio.

One of the striking things shown by these data is the increase in total solids which can be tolerated in a stable solution by increasing the proportion of alkali to silica. The 1:3.90 material carries 30.9% solids (Na_2O plus SiO_2) at the highest concentration at which it can be prepared for market. The 1:3.22 silicate can be concentrated somewhat higher to a point where it carries 39.7 per cent. solids, the 1:2.40 to 46.9 per cent., the 1.200 to 54 per cent., while the most alkaline grade 1:1.60 can actually be concentrated to a point where it carries 62.9 per cent. total solids but still flows as a liquid. The 1:2.40 silicate would be rigid at this concentration and a film of 1:3.9 ratio dehydrated to a water content of 37 per cent. would be hard and glass-like in appearance.

Table II
Typical Analysis of Impurities in Sodium Silicate Solutions

Fe_2O_3	.032%
TiO_2	.039
Al_2O_3	.093
CaO	.034
MgO	.019
Cl	.025
SO_3	.011
CO_2	.022
	.275%

The change in viscosity, as we go from the siliceous to the alkaline silicates is also of much interest. Measured in poises, the most siliceous silicate has a viscosity of 2.6 which compares with 587,000 poises for the heaviest, most alkaline silicate. Notice also that the 1:3.22 silicate at 1.410 Sp.G. has a viscosity of 40 poises while the 1:2.50 grade at almost the same Sp.G. (1.408) has a viscosity of only 0.5 poises. It is generally true that of two silicates with the same specific gravity but different alkali-silica ratio, the more alkaline will have the lower viscosity.

The sensitivity of viscosity to concentrations is clearly shown in the data for 1:3.22 silicate. A solution with 62.4 per cent. water has a viscosity of 1.8 poises. Remove 1.1 per cent. water by evaporation and the viscosity goes to 7.5 poises. Take out only 0.3 per cent. more water and the viscosity jumps to 11.1 poises. From this point the removal of only a slight amount of water sends the viscosity curve straight up—the solution goes to a semi-solid.

The characteristic of sudden change from liquid to semi-solid is of vital importance in adhesive work where the binder must be sufficiently fluid to be evenly spread by roll or fountain and then, in the course of a few seconds over hot plates where small amounts of water are evaporated, the film must set hard enough to withstand the rough treatment of the cut-off knife. When it is recalled that modern machines roll out three miles of paper-board in an hour it is evident that this is no field for adhesives which set in leisurely fashion.

One of the interesting characteristics of the soluble silicates is their gel-forming ability. Any acidic material in amounts sufficient to neutralize the alkali will precipitate silica, and when the conditions are right gels are formed which vibrate with a clear singing tone. The sudden wave of opalescence which, like a cloud, sweeps through a clear solution of acidified silicate at the moment it goes over to a firm gel is of unending fascination and the behavior always seems to have in it something of the miraculous.

Acids are not the only materials which form silica gels. Most of the heavy metal salts precipitate silicates in characteristically colored gelatinous masses which are assumed to be mixtures of silicic acid and metallic silicates. Alcohol, acetone, ammonia and salt brine precipitate the silicates, presumably by dehydration. An interesting point is that such precipitates can be partially redissolved but solutions so formed differ somewhat in viscosity from the original.

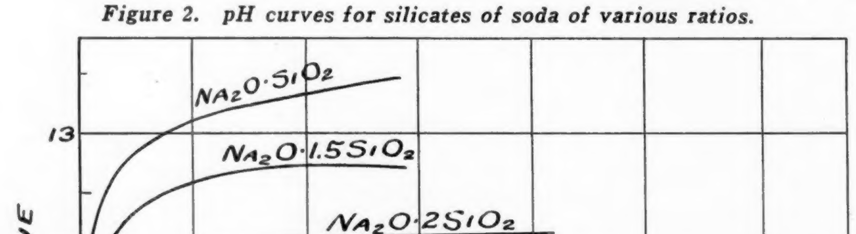
With calcium and magnesium salts the soluble silicates react sometimes with great speed, to form corresponding insoluble silicates. Zinc salts behave similarly and are sometimes used in small amounts to increase the insolubility of cement mixtures. Aluminum sulfate and ammonium phosphate are typical agents for precipitating insoluble silicate complexes on paper and textile fibers where special sizing effects are desired. These reactions do not proceed according to the ordinary laws of stoichiometry. A 1:3 silicate, for instance, in combination with a calcium salt, does not necessarily yield a 1:3 calcium silicate. To obtain reproducible results is a difficult matter involving close control of concentration and temperature of the reacting ingredients.

It should be understood that the silicates we have so far discussed are all colloidal, as is evidenced by the fact that the boiling point for all, even the one which contains only 37 per cent. water, is only slightly above that of water, and they all freeze at very near 32°F. As a matter of fact the heavily concentrated alkaline grades merely grow harder and more brittle as the temperature is lowered. The dilute solutions actually freeze and on thawing, the water tends to separate above the heavier solids. Vigorous stirring to combine the two phases is all that is necessary to return the mixture to its original homogeneous condition.

Crystalline Silicates

When we come to the silicates of greater alkalinity than those in the series just

Figure 2. pH curves for silicates of soda of various ratios.



discussed a sharp change in characteristics is to be seen. Instead of materials with the alkali-silica components variable at the will of the manufacturer we here have definite crystalline salts of fixed composition.

The first, and commercially most important, is the metasilicate. It has long been known scientifically as a sticky gummy material of indefinite hydration and without commercial value, but in 1930 the Philadelphia Quartz Company, following the teaching of Baker,[8] brought out a white, dry, free-flowing metasilicate carrying five moles of water ($Na_2SiO_3.5H_2O$). It found prompt acceptance in the trade and is today well-known throughout the country.

Metasilicate crystallizes with 5, 6, 8 and 9 molecules of water and the crystal forms and angles as well as the melting points have been accurately determined.[9] Only the anhydrous (Na_2SiO_3) and the 5-hydrate form are of industrial importance. They are made by crystallization from mother liquor or more commonly by allowing the solutions to crystallize en masse and then grinding to the desired particle size—usually between 10 and 65 mesh. Since metasilicate is somewhat hygroscopic it must be protected in humid atmospheres but ordinary packages of wood, metal or even asphalt lined papers are used for shipments.

The 5-hydrate metasilicate is very soluble. At room temperature it dissolves at about the same rate as table salt and three pounds or more will dissolve in a gallon of water. This, of course, is far beyond the concentrations actually used. The anhydrous grade is likewise readily soluble though not with the rapidity of the hydrated form.

Commercial anhydrous metasilicate contains about 51.5 per cent. Na_2O and 47.25 per cent. SiO_2. Its melting point is 1089°C. The 5-hydrate metasilicate contains about 29.2 per cent. Na_2O, 28.2 per cent. SiO_2 and 42 per cent H_2O. The melting point for this hydrate is 72.2°C.

In comparison with the metasilicates, sodium sesquisilicate[10] ($Na_3HSiO_4.5H_2O$) contains 36.5 per cent. Na_2O, 23.5 per cent. SiO_2 and 39.0 per cent. H_2O. Its melting point has not been determined exactly but 88°C is the approximate value. The name of this salt is derived from the fact that it contains one and one half moles of Na_2O to one of SiO_2. The formula is often written as $3Na_2O.2SiO_2.11H_2O$ although the other form is entirely proper. Only one hydrate of this ratio is reported in the literature and the anhydrous salt does not exist. In most respects sesquisilicate is similar to metasilicate except that it is more vigorous in its action as would be expected because of the larger proportion of alkali.

In addition to the meta- and sesquisilicates there is also on the market a third silicate containing about 61.5 per cent. Na_2O and 29.5 per cent SiO_2. The remaining 9 per cent. is partly carbonate, partly water. Although this material is referred to as orthosilicate there is considerable doubt that a true orthosilicate really exists. Some believe the commercial product is actually a combination of 9-hydrate metasilicate and NaOH. Certainly it is not safe to give it the formula of a true orthosilicate which would be Na_4SiO_4.

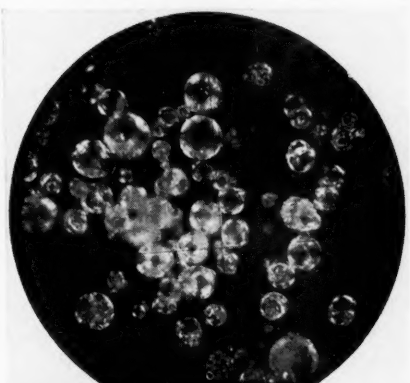
These three silicates, in comparison with other alkaline salts, have unique properties which make them especially useful as detergents. First of all they give pH values definitely higher than those of other alkaline salts at equivalent concentrations. At 1 per cent. for instance the metasilicate will give a pH of 12.3, the sesqui 12.6 and the ortho 12.9. Caustic soda at the same concentration is 13.2 and in the other direction is trisodium phosphate at pH 12.0 (See Fig. I).

Secondly the presence of silica has a buffering effect which enables these solutions to maintain a constant pH over a wide range of concentration. This is true of all the silicates (see Fig. II) but is particularly valuable in these highly alkaline ones which in line of duty frequently encounter acidic dirt and if the pH dropped as the alkali was neutralized, as is the case with the older alkaline detergents, they would soon lose their effectiveness. The buffering effect of the silica keeps the cleansing action at a high pitch until the bath is nearly exhausted.[11] A very important factor in washing is this stabilization of pH at values especially favorable for optimum detergent performance of soap.

A further characteristic of the silicates, particularly valuable in detergency, is that they wet out oily dirt, emulsify the oil and then, as if to show that in spite of being crystalline materials they are still related to the family of colloidal silicates, they deflocculate the solids and prevent them from redepositing on the surface.[12]

The silica end of the molecule also shows its controlling effect in the action on soft metals normally attacked with vigor by alkalies. Of course, as the pH increases this protection decreases. The orthosilicate, for instance, is much too active for safe use on tin and aluminum whereas the metasilicate can be used very satisfactorily. On the other hand for cleaning heavy steel at high speed orthosilicate works with entire satisfaction.

Hydrated powdered silicate (1:3.2) which is magnified by 150 diameters.



Crystals of sesquisilicate as seen through a microscope—magnified 30X.

Conclusion

To adequately summarize the properties of the soluble silicates a great deal more space is needed than is available within the pages of a journal, even one as generous in space as CHEMICAL INDUSTRIES. For readers who need more complete information the author can only recommend that they investigate the wealth of references to be found in the A. C. S. Monograph "Soluble Silicates in Industry" by James G. Vail[13] which, though published thirteen years ago, is still the most complete discussion of the subject.

The other alternative is to consult the manufacturer who, for the most part, is well informed and glad to help. Readers imbued with the Dickens tradition will recall the way David Copperfield's friend, the coachman, sent a proposal of marriage. "Just tell her," he said, "that Barkis is willin'." With an entirely different purpose the manufacturer of silicates also "is willin'." All that is needed is the askin'.

(The uses of the soluble silicates will be discussed in a subsequent issue.)

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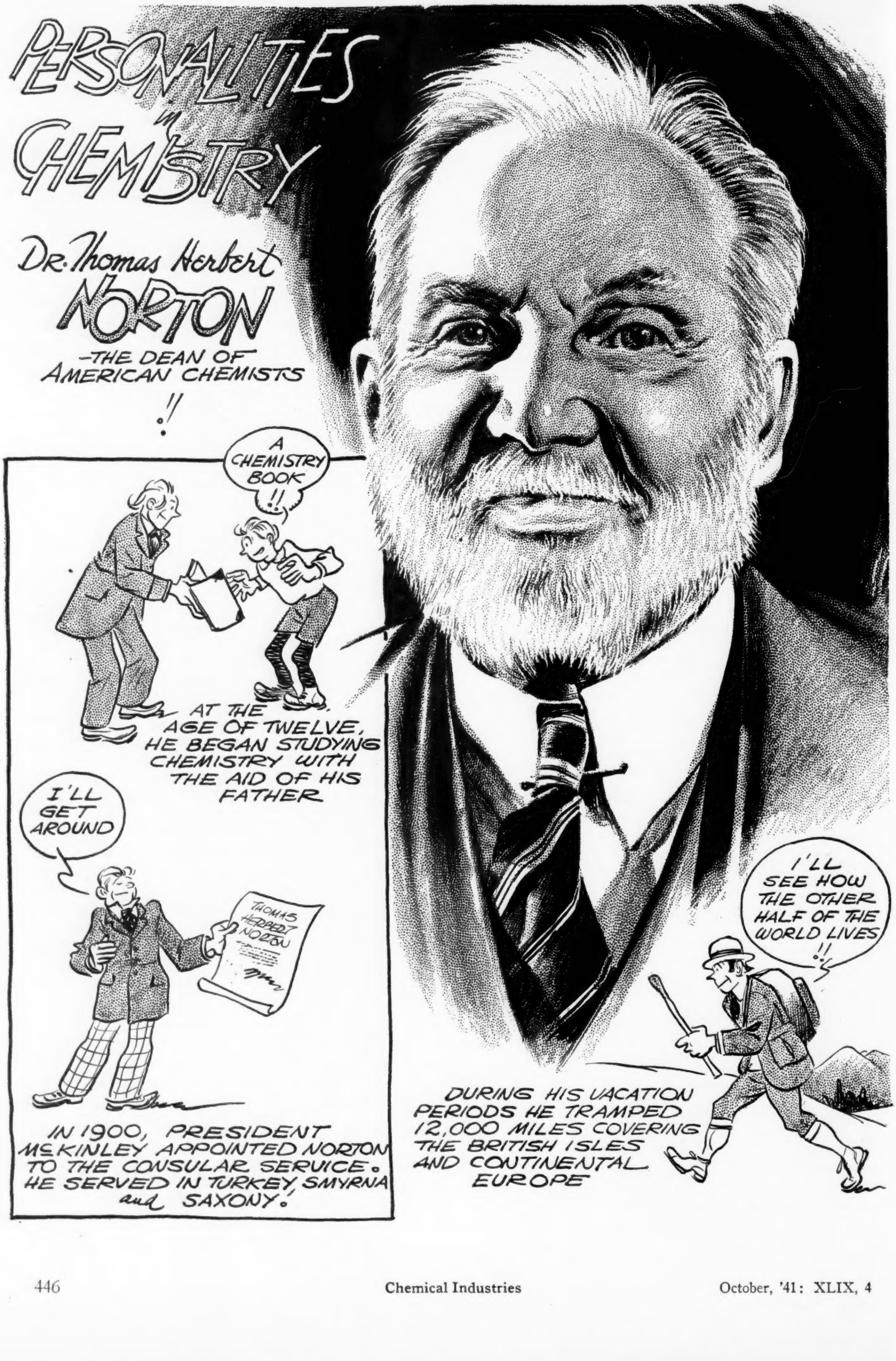
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—THE DEAN OF AMERICAN CHEMISTS !!
A CHEMISTRY BOOK !!
AT THE AGE OF TWELVE, HE BEGAN STUDYING CHEMISTRY WITH THE AID OF HIS FATHER
I'LL GET AROUND
THOMAS HERBERT NORTON
IN 1900, PRESIDENT McKINLEY APPOINTED NORTON TO THE CONSULAR SERVICE. HE SERVED IN TURKEY, SMYRNA and SAXONY!
I'LL SEE HOW THE OTHER HALF OF THE WORLD LIVES !!
DURING HIS VACATION PERIODS HE TRAMPED 12,000 MILES COVERING THE BRITISH ISLES AND CONTINENTAL EUROPE

THOMAS HERBERT NORTON

By

A. D. McFadyen

THOMAS HERBERT NORTON, revered dean of American chemists, has lived not only a long and varied life, but a life exemplifying the finest traditions of the chemical profession. Appraised on the basis of any one of his many activities—as journalist, college professor, linguist, or diplomat—he would be voted the star that adorns his name as a chemist in American Men of Science.

Norton was born in the village of Rushford, N. Y., on June 30, 1851, the son of a Presbyterian minister. In 1860 his father accepted a pastorate at St. Catherines, Ontario. In those days the father was host to many returning missionaries, and their descriptions of foreign lands aroused the lad's "gift for tongues" and provoked his "itching feet" with a lust for travel. While yet in his early 'teens he joined the Canadian Volunteer Militia. At eighteen he was a corporal and had achieved reputation as a sharpshooter. A year spent meanwhile as reporter and city editor of a daily paper crystallized an interest in both people and journalism which was later to bear fruit in many directions; while another year spent in horticulture likewise instilled in him a life-long love of nature, which after many years was to lead to his becoming staff correspondent for the publication "Nature."

Notwithstanding the manifold activities of his youth, Norton was prepared to enter Hamilton College in 1869. "At the age of twelve," Norton relates, "I began the study of chemistry with my father, spending an hour or two on the subject daily." He entered college with his mind set on becoming a chemist. He was graduated in 1873, as valedictorian, winner of the prizes in both physics and chemistry, as well as the Phi Beta Kappa key.

He was tapped for the Delta Kappa Epsilon fraternity in the first week of his freshman year, and thus a new avenue was opened for his highly sociable nature, and which was to lead to his affiliation with the New York, Washington and other chapters of the fraternity. This joy of fellowship led him, while professor of chemistry at the University of Cincinnati, to organize a chapter of the Phi Beta Kappa at that center. Still later, while in the diplomatic service at Constantinople, he brought together the members of this fraternity resident there and formed a permanent organization—the first on foreign soil. In 1896 he was made an honorary member of the Cliosophic Society of Princeton University, which is probably the parent of the Greek letter fraternities in this country. He is a member of Sigma Xi also.

After graduation from Hamilton College, Norton went abroad to pursue his studies under the famous professors Bunsen and Kirchoff, at Heidelberg, where he earned his Ph.D. diploma in chemistry, summa cum laude. This was followed by courses under August von Hofmann at the University of Berlin, and under Adolphe Wurtz at the University of Paris.

During his vacation periods of 1873-8 Norton tramped more than 12,000 miles, covering the British Isles, Austria, Bohemia, the Alps of Switzerland, and the most picturesque parts of Germany. He made an extensive journey through the Tyrol, Venice, Greece, Turkey, Palestine, and the whole length of the Italian peninsula, always taking the by-ways instead of the high-ways that he might see and meet the people in their most natural surroundings. His love of literature and his romantic tastes prompted him on his rambles to read the choicest poems and novels of the several countries amid the scenes where the action was laid.

Norton began active life as a chemist back in 1878 with the Compagnie Générale des Cyanures at Paris, where he served for five years. For a time he was in charge of a dye plant at St. Denis, outside Paris. During this period he acquired membership in the Chemical Societies of London, Paris, Berlin, Petrograd, and the Society of Chemical Industry of London. At the request of the United States Government he prepared a report on the chemical exhibits of the Paris Exposition of 1878.

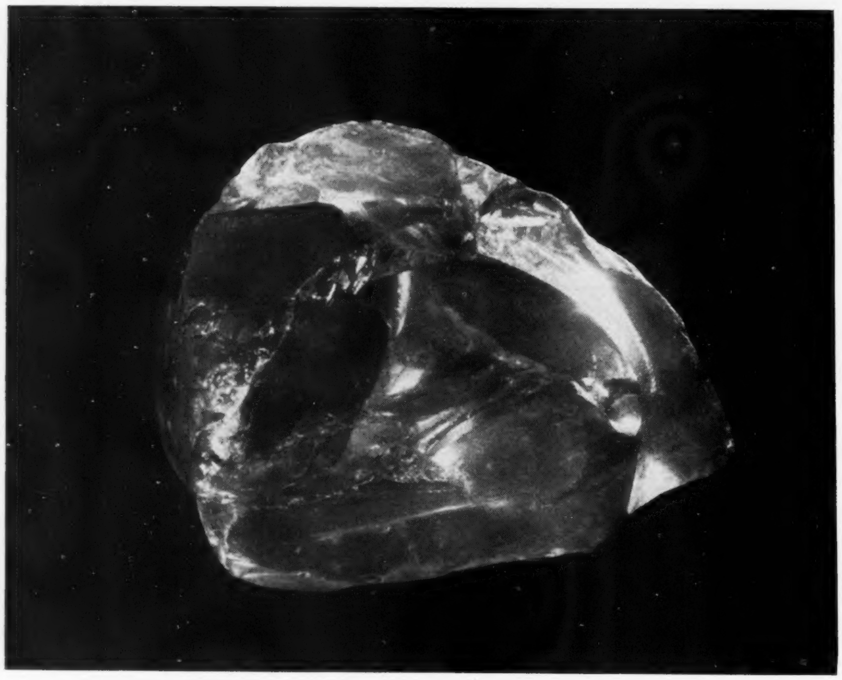
In 1883 Norton returned to America to become professor of chemistry at the University of Cincinnati. During seventeen years at this post, with characteristic zest, Norton entered into the social, religious and intellectual life of the community. In this connection, he joined the American Society for the Advancement of Science; he organized the Cincinnati Chemical Society, which on his initiative was later transformed into the Cincinnati Section of the American Chemical Society.

The spring of 1900 President McKinley appointed Norton to the Consular Service. He served at Harput, Turkey; at Smyrna; and later at Chemnitz, Saxony. During his six years in Turkey, Norton was closely affiliated with the French Chamber of Commerce in Constantinople, contributing economic studies to its bulletins. In Chemnitz he became a member of the Philological Society.

A Consul's life is anything but dull. At Harput, Norton found himself in an environment little changed since the dawn of history. He astonished the community by appearing on a bicycle. With Professor Huntington, he made the first descent of the Euphrates River, using a native raft of inflated goatskins. Sent on a mission to Persia,

(Continued on page 486)

RESINOUS CONDENSATION PRODUCTS



Synthetic resin. It looks like this in the laboratory.

for Protective and Decorative Coatings

By Theodore S. Hodgins and Almon G. Hovey

Reichhold Chemicals, Inc.

Growth of the synthetic coatings industry in the past two decades closely parallels America's mass production goods — autos, washing machines, etc. As comprehensive a treatment of this subject as we've seen is this complete report on the "finishes" industry by two of its men.

THE "finishes" industry exceeds one half billion dollars per year; the synthetic resin output is in excess of 270 million pounds (est.) for 1940. The public is already aware of the role of finishes in Twentieth Century life for protection and decoration; the growth from "rule of thumb" oil paints and japans to the modern scientific synthetic coatings is closely coupled with the rapid growth of the chemical industries in America during the past two decades.

Synthetic coatings have paralleled America's mass production goods,—automobiles, refrigerators, washing machines, furniture, and sundry household appliances. The automobile, for example, once required all hand labor for brushing, sanding and finishing, requiring about two weeks to finish the body and acres of storage space. With the end of World War I, large surplus stores of nitrated cellulose gave impetus to the development of lacquer coatings for the automobile industry, thus speeding up the production line by spraying applications and rapid drying speeds. The alkyd resins, due to their better film-building properties, soon made large inroads into the lacquer field because again a customer could obtain a better job in less time, coupled with good durability and "eye appeal" for his products. In the case of refrigerators, the alkyd finishes have replaced the cellulose lacquers almost completely. In the past few years, urea-formaldehyde enamels, plasticized with alkyd resins, have made considerable progress in white and pastel shades for metal finishing, such as automobiles, refrigerators, stoves, and hospital equipment.

Recently introduced and too young to predict their future, melamine resin finishes are being tried and have shown merit for new heat-resistant finishes, particularly in the case of stove finishing where maximum resistance to discoloration is desired.

Synthetic resins are dependent upon the American chemical industry for raw material: coal for tars and distillates, petroleum for solvents and many synthetic chemicals, the heavy chemicals and high pressure synthesis for acids, alkalis, urea, melamine, etc., and agriculture for oils, glycerine, and alcohols.

Source of Synthetic Resins

Much has been said regarding air, coal, and water as the source of synthetic resins. It is true that coal, as a raw material for synthetic resins, is highly important and is used as the starting point in our flow sheet. It is true that there is hardly an important type of synthetic resin which does not have at least one of the principal reacting ingredients consisting of a derivative of coal. However, much of the large volume items have as raw materials products obtained from the petroleum industry and from agricultural crops. Among the more important derivatives from petroleum are the aliphatic and aromatized solvents and also the methanol and subsequent formaldehyde production from methane. Among the important agricultural products are the various drying, semi-drying and non-drying vegetable oils, rosins, and such alcohols as ethanol and butanol. The vegetable oils are also the source of glycerine, one of the important ingredients in alkyd resins.

The flow sheet shows the derivation of some synthetic resins from the principal raw materials employed in their manufacture.

Thermoplastic Resins (Softened by Heat)

The polymerization of the styrene or vinyl benzene with suitable catalyst produces the polystyrene resins. Calcium carbide is produced in an electric furnace at 2000°C. from a mixture of coke and lime. The addition of water produces

Table I
Principal Resin Raw Materials
U. S. Production 1917-1937
(1,000 Pounds)

Year	Phthalic Anhy-dride	Glycerol	Phenol	Formal-dehyde
1917	139	*	*	*
1918	227	*	106,794	*
1919	291	62,348	1.544	25,007
1920	796	64,431	*	*
1921	202	*	*	9,657
1922	1,629	*	*	23,958
1923	2,344	100,361	3,311	24,081
1924	2,787	90,611	*	26,155
1925	3,900	108,106	14,734	31,456
1926	4,379	114,039	8,691	31,953
1927	4,550	108,392	8,041	29,920
1928	6,031	113,041	10,227	38,718
1929	9,169	125,772	24,178	51,786
1930	6,693	120,628	21,147	40,763
1931	*	113,894	17,981	*
1932	6,259	105,163	13,965	*
1933	14,076	104,119	33,220	52,236
1934	20,680	128,912	44,935	†
1935	23,422	123,390	43,419	†
1936	31,244	132,921	48,724	†
1937	45,211	144,683	65,690	†

* Not available.
† Not publishable; figures would disclose operations of individual firms.
Source: U. S. Tariff Commission Report 131, 2d Series, 1938.

acetylene, the starting point of a long list of synthetic resins. When acetylene gas is passed through acetic acid, vinyl acetate is formed. If hydrochloric acid is used instead of acetic, vinyl chloride is obtained. The polymerization of these compounds yields vinyl resins. The acrylate resins may be obtained from the same basic raw materials by an entirely different procedure. Synthetic rubber is also derived from acetylene as are acetic anhydride and acetic acid and many other chemicals of commercial importance.

In paint and varnish, many thermoplastic resins of high melting point, which border on the lines of processed natural gums such as fused copals and their esters rather than as real "synthetics," are cooked with drying oils. The glycerol esters of rosin described by Schaal, 1883-1893, generally regarded as the first synthetic resins for varnish and lacquer, are still widely used on account of low cost and good availability. Interaction of phenols, aldehydes, and ester gums produces the important "modified phenolics."

Thermosetting Resins (Hardened, Not Softened by Heat)

Benzene and naphthalene, both from coal, are readily converted to maleic anhydride and phthalic anhydride when treated with certain mixtures of air at elevated temperatures. Both of these di-basic acids when treated with glycerine (a by-product of the soap industry) yield complex esters which are the starting point for alkyd resins. Commercial alkyd resins are usually oil-modifications of the glycerol phthalate esters.

The phenols from coal tar, either separately or mixed, when condensed with formaldehyde, give the highly important phenolic resins. Acid catalysis yields the Novolac type which are not thermosetting unless in admixture with the Resol type. Alkaline catalysis gives the Resol (convertible) type which is used in molding compounds, and the oil-soluble Resols are used in the surface coating, paint and varnish fields.

Table II
Factory Consumption of Oils in Paint & Varnish Industry 1936-1940
(1,000 Pounds)

	1936	1937	1938	1939	1940
Total Oils	429,020	458,522	358,134	423,113	434,736
Soybean	14,471	16,143	15,183	21,720	29,828
Linseed	233,340	267,184	216,568	246,965	270,239
Tung	94,642	105,731	78,310	82,307	54,611
Perilla	53,222	31,776	23,528	28,674	14,659

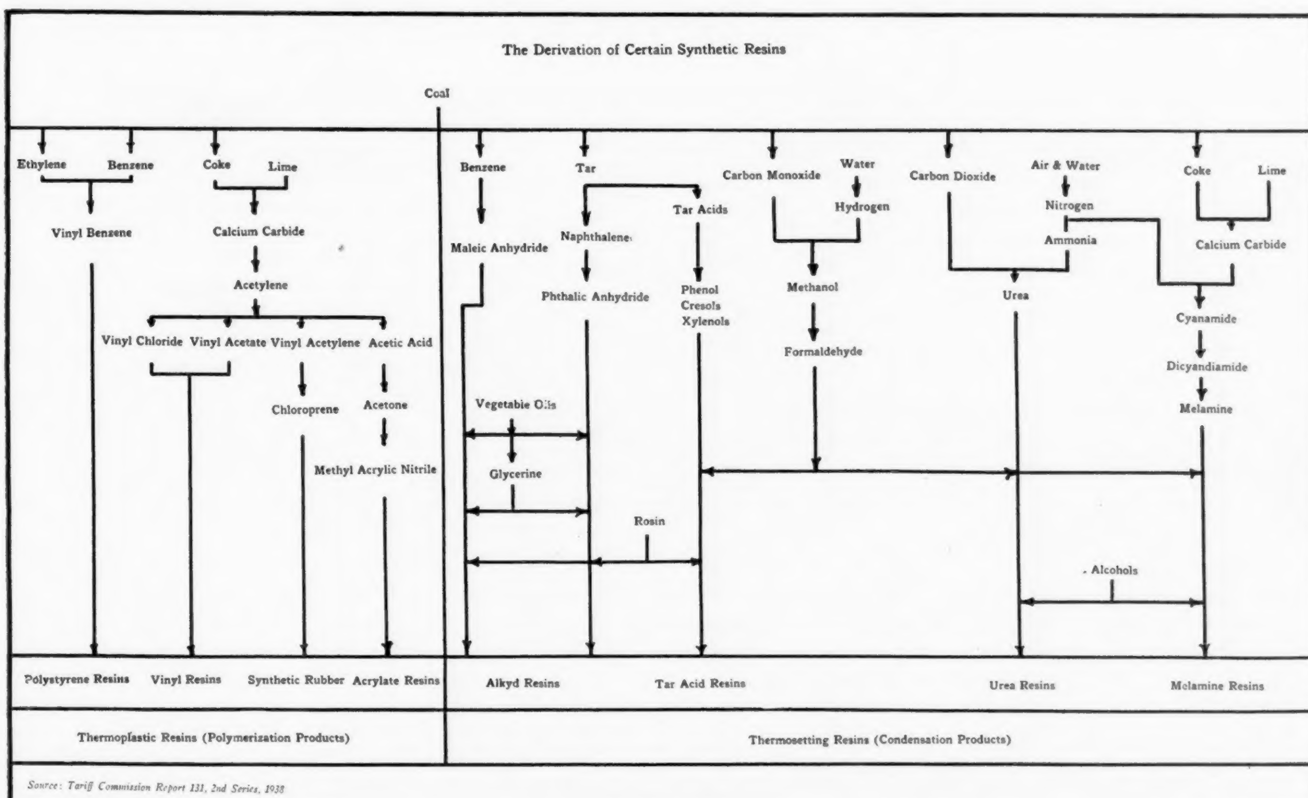
Source: Bureau of Census "Animal & Vegetable Fats & Oils" 1941.

Urea, from air, coal, and water, may be condensed with formaldehyde to produce molding resins. Modification with alcohols yields surface coating urea resins.

Melamine, the trimer of dicyandiamide, also from lime, coke, air, and water, condenses with formaldehyde in a similar manner to urea to produce molding and surface coating resins.

Growth of the Synthetic Resin Industry

Prior to World War I, the synthetic plastics industry was confined to a few types of phenolic resins together with cel-



Above, a photograph showing the extensive laboratory control methods of the industry.

luloid, rubber, gutta percha, shellac, and casein plastics. Probably, the first successful synthetic plastic material was the discovery of celluloid by Hyatt in 1868. By treating cotton with nitric acid, a material was obtained which could substitute for ivory in billiard balls and to replace amber, mother-of-pearl, tortoise shell, etc.

Spitteler in 1890, discovered casein plastics in an attempt to make white blackboards. He found that casein (from milk) could be hardened by treatment with formaldehyde. Casein plastics are used for buttons, buckles and other ornaments.

Phenol Resins

As early as 1872, the reactions of aldehydes with the phenols derived from coal tar were being studied, and by 1900, there were many investigators in the field of phenol-formaldehyde resins. In 1909, Baekeland obtained what is commonly known as the basic patents on the commercial aspects of production of phenolic (Bakelite) resins. Molded articles familiar to the public such as ash trays, cameras, pencil and pen barrels, bottle closures, electrical equipment, trays, table and counter tops, etc., generally arose from the industrial control of the phenol-formaldehyde resin reaction.

Table III
Tar-Acid Resins: U. S. Production 1927-1937

Year	Production (1,000 lbs.)	Unit Value
1927*	13,452	$0.47
1928*	20,412	.35
1929†	26,236	.39
1930†	18,338	.38
1931†	22,647	.31
1932†	17,163	.26
1933†	31,698	.23
1934†	40,664	.25
1935†	52,732	.19
1936†	70,349	.19
1937†	79,845	.19

* All coal-tar resins.
† Tar-acid resins only.
Source: Compiled from Annual Reports of the Tariff Commission on dyes and other synthetic organic chemicals in U. S.; Report 131, 2d Series, 1938.

In 1926, the early patents on phenolic resins began to expire and a new impetus was given to the industry. From this time on, the research workers modified the phenol-formaldehyde resins to give different properties, one of the important advances being the discoveries of Hönel and Turkington in producing concentrated oil-soluble phenolics to obtain quick-drying, durable, water-resistant varnishes. The public learned of this discovery through the introduction of improved spar varnishes. The earlier oil-soluble "modified phenolics" introduced by Albert consisting of rosin modification of phenol-aldehyde resins, were especially useful in making "4-hour varnishes" with china wood oil.

Trade names of phenolic and modified phenolic resins are: Amberol, Beckacite, Beckophen, Bakelite, Catalin, Durez, Durite, Heresite, Indur, Makalot, Marblette, Paranol, Phenac, Prystal, Resinox, and Super-Beckacite.

Alkyd Resins

The alkyd resins, used principally for paints, varnishes, lacquers, and printing inks, are the condensation products of a polyhydric alcohol such as glycerol and glycols and a polybasic acid such as phthalic, maleic, adipic, succinic, and sebacic. These condensation products are almost always modified to give the properties required for specific applications. The modifying agent may be oils and/or fatty acids of the drying, semi-drying, or non-drying types, and natural or other synthetic resins.

Berzelius' report in 1847 of the formation of a soft, resinous mass from tartaric acid and glycerol probably constitutes the first recorded experiment in this field. Van Bemmelen, in 1856, first disclosed a glycerol succinate resin.

Table IV
Alkyd Resins from Phthalic and Maleic Anhydride
U. S. Production 1933-1937

Year	No. of Makers	Production (Pounds)	Unit Value
1933	6	9,930,705	$0.18
1934	10	15,219,247	0.14
1935	15	34,312,713	0.22
1936*	31	46,952,452	0.22
1937*	39	61,254,019	0.20

* Includes resins from maleic anhydride.
Source: Dyes and Other Synthetic Organic Chemicals in the U. S., U. S. Tariff Commission; Report 131, 2d Series, 1938.

In 1901, Watson Smith, engaged in research on phthalein dyes, reported a transparent, highly refractive resin-like substance produced by heating glycerol and phthalic anhydride. He suggested its use as a cement for ceramic wares.

The General Electric Company, in search of improved insulation and coating compositions, studied the glycerol phthalate reaction intensively during the following two decades. Kienle and Hovey published general laws of resin formation in 1929-1930. In 1933, Kienle was granted U. S. Patent 1,893,873, assigned to General Electric, which was considered the basic alkyd patent. Early in 1936, this patent was declared invalid in a suit claiming infringement brought against the Paramet Chemical Company of Brooklyn, New York. The decision appeared to open up the alkyd resin field.

During the latter part of the "twenties," Du Pont introduced Dulux finishes. Carothers and co-workers working at the Du Pont Experiment Station, published many generalizations in the field of condensation and polymerization reactions. His work led not only to a better understanding of synthetic resins, but to the new commercial development of synthetic fibers and filaments, e. g., Nylon.

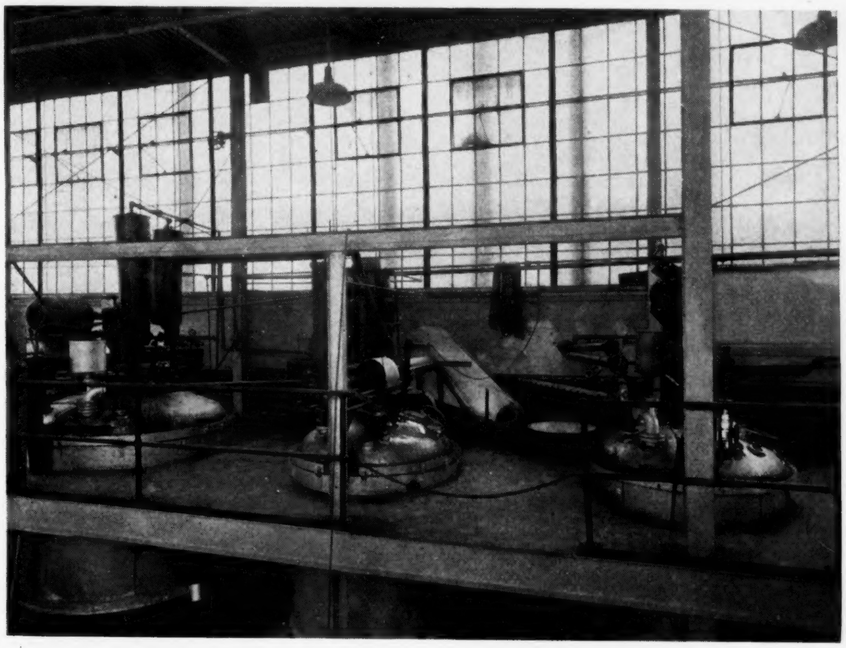
U S. Patents 1,870,453 - 5, issued in

1932 (application 1927) to Hönel and assigned to Beck, Koller & Company, now Reichhold Chemicals, Inc., are considered the basic patents on phenol-modified alkyd resins.

Among the principal brands of alkyd resins on the market are: Amberlac, Aquaplex, Beckosol, Dulux, Duraplex, Esterol, Glyptal, Lewisol, Makalot, Mirasol, Paraplex, Rauzone, Rezyl and Teglac.

Urea Resins

One of the most important thermosetting resins is the group made by condensing urea and formaldehyde. Gold-Schmidt, in 1896, first reported an amor-



phous glass-like condensation product from urea and formaldehyde. Considerable research work was then carried on to produce a substitute for glass. It was found, however, that the resin obtained had a high moisture adsorption with consequent loss of luster and developed fissures and cracks. The introduction of thiourea improved the strength and moisture resistance, but the sulfur attacked the molds and reduced the conversion rate.

In spite of early failures, John, U. S.

Table V
Urea Resins: U. S. Production 1933-1940

Year	Production (Pounds)	Unit Value
1933	3,234,356	$0.48
1934	3,470,916	0.41
1935	4,202,536	0.46
1936	*	....
1937	*	....
1938		
1939	16,570,000	
1940†	21,491,653	

* Not publishable; figures would reveal operations of individual firms.

† Preliminary.

Source: Dyes and Other Synthetic Organic Chemicals in the U. S.; U. S. Tariff Commission Report 131, 2d Series, 1938.

Patent 1,355,834 (1920), saw clearly the wide, practical possibilities of urea-formaldehyde resins not only for molding, but for adhesives, bonding materials, impregnating media, and coating compositions. About 1929, the first successful urea-formaldehyde molding resin composition was perfected and marketed. It was found that purified alpha cellulose minimized the stresses, and while the cellulose filler destroyed the transparency, it permitted the manufacture of translucent articles in a wide range of color.

It was not until about 1936, however, that urea resins suitable for paint, varnish and lacquer resins were produced commercially. Urea resins for coatings are modified in such a manner that they are soluble to a certain extent in hydrocarbons and miscible in the commonly used resins and varnishes. In commercial application, these modified urea resins are blended with alkyd resins to produce light-colored, marproof, alcohol-, grease- and oil-proof and mildly alkali-proof finishes. These finishes protect and decorate refrigerators, automobiles, metal cabinets, etc.

Trade names of urea-formaldehyde resins are: Beckamine, Bakelite Urea, Beetle, Plaskon, Rauzite, and Uformite.

Melamine Resins

Although Hofmann, in 1874, first found that melamine produces a resinous product, it was not until 1939 that melamine-formaldehyde resins were introduced commercially in this country. This was largely due to the high cost of melamine (about $40 per pound) until commercial production by the American Cyanamid Company was available. Resins are produced from melamine for molding, laminating, impregnating, and surface coating applications. The outstanding properties of melamine resins are their remarkable speed of conversion, heat-resistance, and color stability. They are finding application in finishes for stoves where the finish is subjected to high temperatures. These resins are so new that it is difficult to predict their future in the synthetic resin field. Trade names of products are: Melamac, Super-Beckamine, and Uformite.

Left and below, production photographs showing reaction vessel in operation. Photos typify synthetic resin plants.

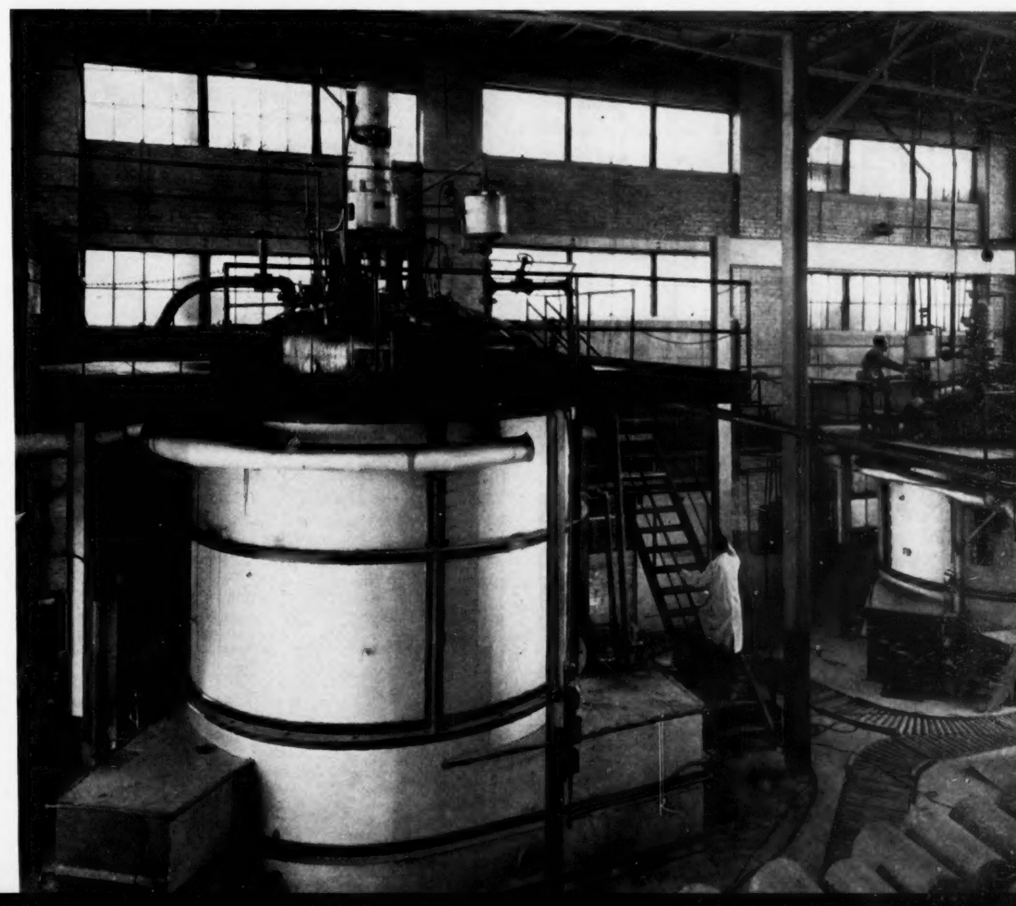


Table VI Synthetic Resin Production 1921-1940 (1,000 Pounds)		
Year	Coal-Tar*	Non-Coal-Tar
1921	1,644	
1922	5,944	
1923-26	†	
1927	13,542	
1928	20,411	
1929	33,036	
1930	30,868	
1931	34,179	
1932	29,039	1,898
1933	41,628	3,572
1934	56,059	†
1935	90,913	†
1936	117,302	15,611
1937	141,099	21,006
1938	......	.....
1939	179,338	44,792‡
1940§	222,943	51,355‡

* Does not include resins from adipic acid, coumarone, indene, hydrocarbon, polystyrene, succinic acid and sulfonamides. With the exception of coumarone and indene resins in recent years, production of the resins not included was small.

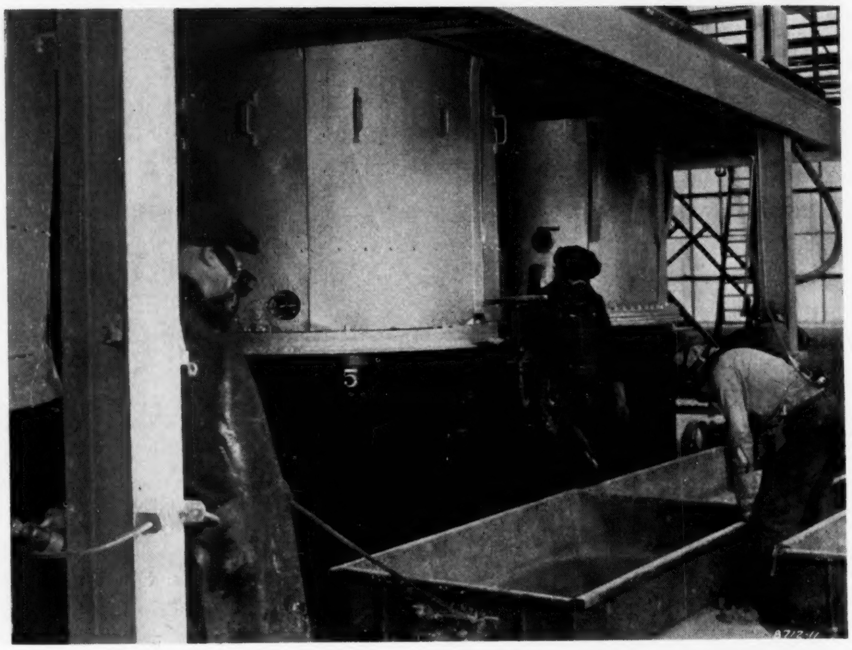
† Not publishable; figures would reveal operations of individual firms.

‡ Ureas 1939, 16,570,000 pounds; Esterified, 28,221,892 pounds.

Ureas 1940, 21,491,653 pounds; Esterified, 29,863,160 pounds.

§ 1940 figures are preliminary.

Source: Compiled from Annual Reports of the Tariff Commission on Dyes and other Synthetic Organic Chemicals in the U. S.; Report 131, 2d Series, 1938.



Above, another production photo. Preparing a solution for use in the process.

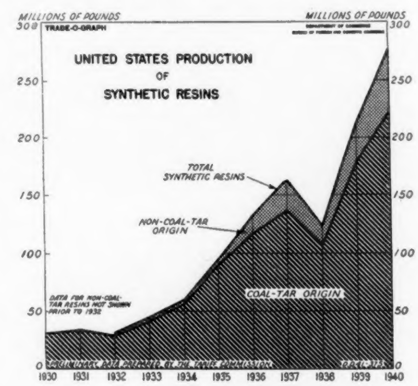
Trends in Synthetic Resins During the Period of Emergency

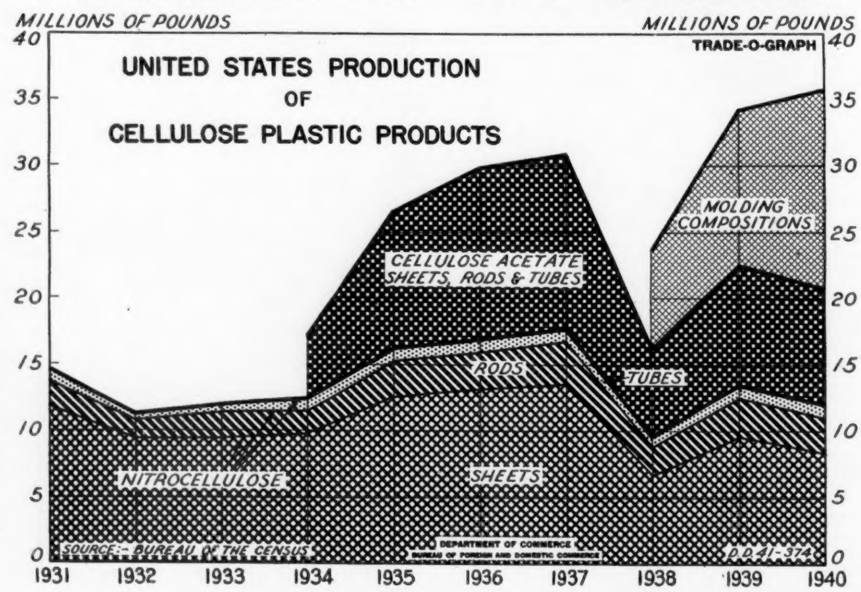
The synthetic resin industry and the industries which it serves, particularly the coatings and plastics industries, are now well aware of the scarcity of vital raw materials due to priority on phthalic anhydride, formaldehyde, the phenols and acetone. Also scarce, at the moment of writing, are maleic anhydride, its adducts and kindred dibasic acids, imported fossil gums, and certain oils such as china wood oil.

Alkyd resins based on phthalic anhydride, due to their long life on exterior exposure, have been chosen by the Navy and the Army for the basis of coating materials for battleships, tanks, machine guns, and other implements of defense, to be used in ever increasing quantities. Now that dibutyl phthalate enters directly into the preparation of the new, modern, flameproof powders, this new consumption of phthalic anhydride is capable of using the present production capacity.

Formaldehyde is scarce primarily because the equipment for its production has been diverted for other defense needs.

The producer of resinous products and coating materials, upon searching for available raw materials in quantities, finds large supplies of rosin and aliphatic hydrocarbon solvents, a supply of some domestic drying oils which are steadily growing scarcer, limited supplies of glycerine and a very small amount of dibasic acids. It will, therefore, be seen that bottlenecks exist and that soon even the public will realize it. It is, therefore, a necessity to make this small amount of materials cover as wide a field of application and usefulness as possible. These relatively new synthetic resins such as alkyd, urea-formaldehyde, melamine-formaldehyde, and phenol-formaldehyde resins which have been the basis of much improvement during the past decade or two must be eliminated as a possible source of a large volume for non-priority coatings as long as this emergency lasts. In effect it appears that much of the progress which has been made during the past quarter century will have to be dropped temporarily except for defense. Civilian needs, however, will continue to exist and they will have to be filled from the available sources of raw materials if at all. Undoubtedly, out of this emergency more efficient means will be found to produce useful "ersatz" products from available materials. Likewise, out of our laboratories will come not only new products for defense and war, but new products for peace.





Between the Lines

Munitions and Alcohols

By Kenneth Tator

TODAY, as never before, our daily newspapers are saturated with news of impending chemical shortages or reliefs and general disturbances in the demand-supply relations in the chemical market. It is seldom that the news articles describe these relations and it is doubtful that the reporter is cognizant of their full market significance. Much valuable market information is there, however, snugly sandwiched between the news lines.

Kenneth Tator

Such a newsworthy item as "U. S.-Japanese Relations Strained, Silk Imports stopped" may be interpreted into near future tightening of the market positions of caustic soda, acetic acid, acetone, pulp, cotton linters, copper sulfate, sulfuric acid and benzol. Ability to read "Between The Lines" of today's news has become invaluable to the smooth operation of the production and sales divisions of the chemical industry.

Ever prominent in our daily news are stories of the increasing streams of munitions being manufactured for home defense and shipments abroad. Other items have appeared from time to time describing official regulations of various chemical commodities. Notable of these are priorities, allocations, or price control of anhydrous ammonia methanol, formaldehyde, acetone, ethyl alcohol, and a variety of solvents and plasticizers. The popularly written munitions news-stories and the statements of official action are the same story expressed in two different ways.

Prominent in the manufacture of ammunition are such tools of our chemical industry as ethyl alcohol, acetone, ethyl ether, tributyl phosphate and anhydrous ammonia. It is readily apparent that diversion of materials from our chemical market to this rapidly expanding industry must severely strain supplies, as increase in production capacity cannot keep pace with the demand. All of these materials, with the exception of anhydrous ammonia, involve ethyl alcohol in their manufacture. The mandatory priority order covering ethyl alcohol was then a logical consequence.

In addition to these munition requirements ethyl alcohol, as a key raw material in our organic chemical industry, feels also the increasing demands of the general chemical industry, prodded by our emergency production program.

Ethyl alcohol is commercially manufactured by three processes (Fig. 1): two synthetics, from acetylene and ethylene; and by fermentation. The acetylene process is probably the least important of these three. In passing it might be noted that this process is based upon a catalytic conversion of acetylene which in turn is derived from calcium carbide. Production of carbide is limited as the electric furnaces required are slowly augmented even in times of ready metals, power and fabrication availability. Some of our carbide production is being diverted from domestic consumption by shipments to England. Acetylene is furthermore also required for the neoprene, butadiene rubber and vinyl plastics industries.

The ethylene process deserves special attention. Natural and petroleum refinery gases, rich in ethylene, are sulfonated and subsequently hydrolyzed to ethyl alcohol. As the gases from these sources contain also appreciable amounts of propylene and butylene, isopropyl alcohol and secondary butyl alcohol appear as co-products in the hydrolyzate. Rectification effects separation of these three commercial alcohols.

The fermentation process is the time-honored source of this material and an appreciable factor in present day production. Black-strap molasses principally from the West Indian islands, is the principal raw material, although corn and other grain or potatoes may be used when economics justify. In addition to the fermentation plant used in this process rectification equipment is also necessary. By varying the nature of the charge, ferment, and operating conditions normal propyl alcohol, normal butyl alcohol, amyl alcohols and acetone may be produced as alternative or co-products.

Thus it may be seen that the supply of all of the commercial important alcohols is intimately linked to ethyl alcohol, either as co-product, through common production equipment, or as will be discussed later, the requirement of ethyl alcohol as an intermediate. Methanol is the exception, and the relation of our munitions program to the methanol supply is not as readily apparent.

Of all the munitions-essential chemicals, anhydrous ammonia probably occupies the most prominent position. It is used in the manufacture of the nitric acid essential to the many nitrations, and for the production of explosives consisting, in whole or part, of ammonium salts.

Anhydrous ammonia is most suitably produced in quantities nicely proportioned to demand (assuming adequate plant capacity) by the synthetic nitrogen fixation process (Figure 2). The alternative methods of producing ammonia, coal tar distillation and tankage, are most economically suited for the production of ammonium sulfate or ammonium hydroxide solutions and their production is inflexibly fixed by the respective demands for coke and meat products. The synthetic ammonia process is a high pressure catalytic conversion of hydrogen and nitrogen into ammonia. Interestingly the present principal method of methanol production is by the high pressure catalytic conversion of carbon monoxide and hydrogen into methanol (Figure 3). The similarity between the synthetic ammonia process and that for synthetic methanol is more than

Figure 2

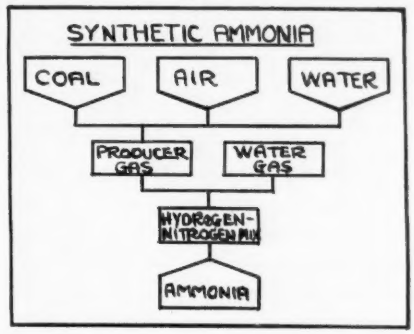
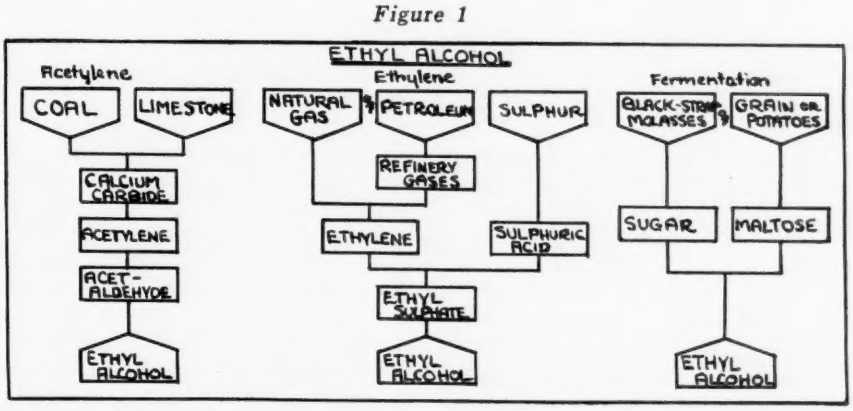
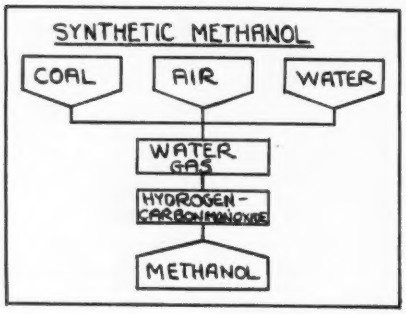


Figure 1



is indicated by comparison of the two charts. With minor changes the synthetic methanol plants are readily adapted to produce anhydrous ammonia. In the expansion of our munitions efforts at least

Figure 3



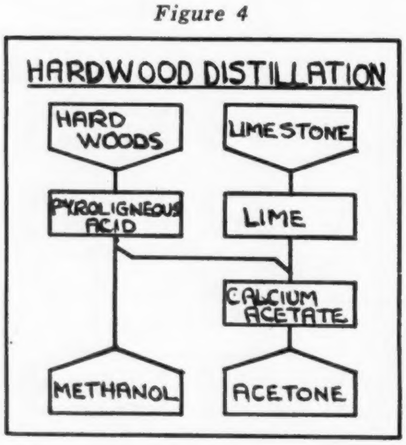
one of the synthetic methanol plants was so converted in order to augment our existing nitrogen fixation processes. This plant was "Borrowed" until the time that additional fixation plants, now under construction, might be put into full operation. The resulting drop in methanol output was culminated by the mandatory priority order on that chemical.

. Thus it is apparent that our munitions expansion has created shortages or dislocations in the supply of all of our commercial alcohols. Specifically:

Methanol. Any demands which methanol may have in our defense economy by virtue of its solvent or methylating properties is dwarfed by the demand for it as a sole source of formaldehyde. The formaldehyde shortage resulting from methanol curtailment has caused the phenol-formaldehyde and urea-formaldehyde plastics, urgently needed in our defense program, to be allotted to industry by official order.

Some speculation is rife regarding the extent to which the hardwood distilling industry (Figure 4) will be able to augment present methanol supplies. It seems reasonable that no real relief may be hoped for from this source unless a direct subsidy or preferential price is set in favor of this industry. Within the past

Figure 4



ten years the low cost of the synthetic process virtually drove the wood distillers out of production. Comparative production costs as reflected by the respective prices in 1930 are 60 cents per gallon for wood distilled and 30 cents per gallon for synthetic methanol. It furthermore seems reasonable that the hardwood distillers must be allowed to amortize the expense of recommissioning their plants during this emergency as ultimate resumption of a normal peace-time economy will again curtail their activities.

Under the impetus of our present metal-substitution program our plastics industry is rapidly expanding, and plastics will permanently become a more important part of our domestic and industrial life. Such a trend will require that our methanol production be permanently expanded beyond our previous normal output. Thus even with the return of the methanol convertors to methanol production it is apparent that our methanol supply will be inadequate. One method of achieving expansion is through that same agency which is responsible for today's short supply. The raw gases used in the synthetic ammonia process must be purified of all compounds other than hydrogen and nitrogen. These gases contain appreciable amounts of carbon monoxide. Elimination of carbon monoxide may be accomplished by catalytically combining it with some of the hydrogen to form methanol, prior to passing the now carbon monoxide-free gases to the ammonia convertors.

Ethyl Alcohol. Ethyl alcohol is consumed in large volumes by the munitions industry as colloiding agent and indirectly as a source of ethyl ether, acetone, butyl alcohol and other solvents and plasticizers. In addition ethyl alcohol is widely used in organic chemical synthesis as an ethylating agent, and as a general solvent and extractant.

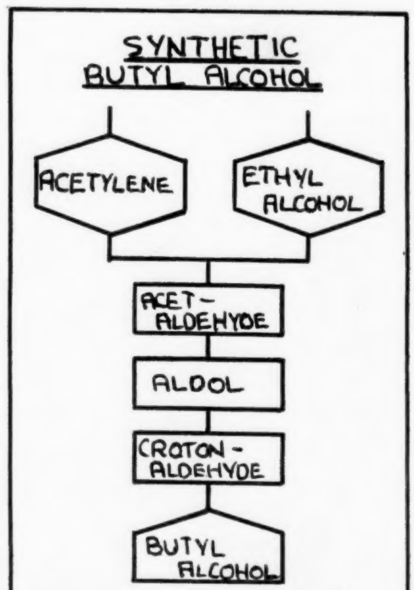
Ethyl alcohol production capacity is only very slowly expanded even in times of metals and fabrication availabilities, inasmuch as extensive fermentation or sulfonation and rectification equipment is required. The fermentation process for the production of ethyl alcohol, which accounts for a large part of the supply, is further liable to transportation bottlenecks, as its raw material, black-strap molasses, must be transported from the sugar producing islands to the fermentation plants. The tankers used in this transport are today being eyed enviously by those governmental agencies controlling the transportation of petroleum products. Substitution of domestically produced corn or potatoes will, however, relieve these tankers to other uses and increase our self-sufficiency. A further interesting method of which we may hear more very soon is the enlistment of the whiskey and other hard liquor distillers to produce industrial alcohol. Most of these liquor manufacturers possess suitable fermentation equipment and many of them complete rectification plants.

Normal Propyl Alcohol. The small demand for normal propyl alcohol is supplied as by-product in the fermentation ethyl alcohol process. Normal propyl alcohol has very little use in industry, the normally more abundant iso-propyl alcohol filling demand for alcohols of this chain length.

Iso-Propyl Alcohol. Normally iso-propyl alcohol is used in place of ethyl alcohol in order to avoid the legal restrictions upon the latter, and as a propylating agent in organic synthesis. Today iso-propyl alcohol is almost exclusively used as an intermediate in the manufacture of acetone, which went on priority a short while ago. The present vigor of acetone production has left very little iso-propyl alcohol available to the civilian industry. Iso-propyl alcohol is produced as a co-product in the ethylene sulfonation process for ethyl alcohol, as propylene is invariably associated with ethylene in the gases used for this synthesis.

Normal Butyl Alcohol. Normal butyl alcohol is used as a medium boiling solvent in the formulation of cellulose ester lacquers, and as a butylating agent in chemical synthesis and in the manufacture of butyl esters. It is principally manufactured by a selective fermentation process in which acetone is produced as a co-product. In this process it uses equipment which would be suitable for the production of ethyl alcohol and therefore subject to prior use for this purpose. Normal butyl alcohol may be also manufactured synthetically from acetaldehyde, an intermediate in the acetylene ethyl alcohol synthesis or from ethyl alcohol itself (Figure 5). Owing to the priority status of ethyl alcohol it is obvious that butanol production from

Figure 5

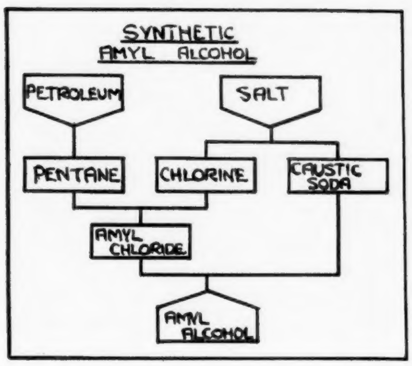


either of these two sources will be restricted during this emergency.

Secondary Butyl Alcohol. Secondary butyl alcohol also is used as a medium boiling solvent in the formulation of lacquers and in the manufacture of secondary butyl esters and other butyl compounds. It is obtained in the synthetic ethylene process for ethyl alcohol by sulfonation and subsequent hydrolysis of the butylene present in the reacting gas.

Amyl Alcohols. The principal uses of the amyl alcohols are as lacquer solvents and in the synthesis of amyl compounds. A large part of the production of amyl alcohols is from fusel oil, a by-product in the fermentation process for ethyl alcohol. Synthetic amyl alcohols are produced by the chlorination and subsequent hydrolysis of pentane (Figure 6). This method,

Figure 6



methanol production excepted, is the only method of alcohol production which is not intimately tied in with ethyl alcohol production or production equipment. The process is, however, restricted at the present time by the shortage of chlorine, used in large quantities for purification of munitions' pulp and linters, as well as numerous defense demands.

Significance. As a consequence of these activities it seems apparent that supplies to civilian industry of methanol, ethyl alcohol, iso-propyl alcohol, and normal butyl alcohol will be restricted for some months to come. The restriction of the iso-propyl alcohol supply is due to its demand for the manufacture of acetone. In the case of normal butyl alcohol curtailment will follow probable conversion of its fermentation equipment to ethyl alcohol manufacture. Those alcohols, namely normal propyl, iso-butyl, secondary butyl, and fermentation amyl, which are co-products in ethyl alcohol synthesis may be expected to increase in production although their supply will be actively competed for as substitutes for the restricted solvents. The lower alkyl esters, such as methyl acetate, ethyl acetate, and iso-propyl acetate, are in some cases adequate substitutes for the solvent alcohols and the market position of these esters is tightening because of such substitution.

Foreign Literature DIGEST

By

T. E. R. Singer

BUMAZHNAYA PROMYISHLENNOST (Paper Industry) No. 2 (1941) p. 13.

Sulfite Pulp Bleaching: The quantity of chlorine necessary to bleach a sulfite pulp of a given coarseness to a certain standard whiteness depends not only on the coarseness of the unbleached pulp but also on the conditions and system of bleaching, particularly on the number of bleachings involved. To determine the quantity of chlorine necessary in a given case it is necessary to determine the coarseness of the cellulose and the conditions under which the bleaching is carried out. A number of experiments were conducted in which there was only one bleaching operation, and numerical data are given on the quantity of chlorine used (in per cent.) with pulps of differing coarseness. Similar experiments and data are also given for bleaching with one, two and three operations.

PRIRODA (Nature) No. 4 (1941) p. 78.

Carotene: This substance occurs in the leaves, flowers, fruit, etc., of a wide variety of plants, and in milk, animal fat, etc. In recent years considerable attention has been devoted to the study of carotene and its extraction from various sources since it is necessary to the growth of man and animals. In animal organisms carotene-b splits into vitamin A, and therefore carotene is not only used as a coloring material in the manufacture of margarine but also finds wide application in medicine.

Existing methods for the extraction of carotene from fresh plant material are not applicable to the utilization of the raw materials in a dry condition since large quantities of the carotene are decomposed in the latter case.

A new method for the recovery of carotene from either dry or fresh plant material has been developed by C. Dronov. It consists in treating the plant raw material with a binary mixture of a fat and oil solvent and a substance which takes up water—for example, a mixture of petroleum ether with ethyl alcohol. Such a mixture permitted the almost complete extraction of all extractable substances from the plant material, including carotene. The resulting extract consisted of two fractions, the ether fraction and the water-alcohol fraction. The carotene was contained in the first fraction whereas almost all the other extractable substances were contained in the latter fraction. The inventor claims that by this method 85-90% of the carotene content in raw carrots can be extracted, and 70-75% from pine needles.

This method is industrially promising because it can utilize either fresh or dry, food or non-food raw materials and permits manufacture of carotene at any time of the year. Moreover, vitamin C, chlorophyll and vitamins E and K can be obtained as by-products when carotene is extracted from pine needles.

KOGYO KAGAKU ZASSI (Journal of the Society of Chemical Industry), Japan, Supplemental Binding vol. 44 No. 2, February 1941, pp. 76-77,

Studies on the ammonium-soda process under high pressure carbon dioxide (III-IV) Syogo Utida (In English) pp. 77-82. On the catalytic reaction of carbon monoxide and hydrogen under high pressure (II). The influence on the iron catalyst of the increase of the pressure, when used for benzene synthesis. Hidekazu Tahara, Yasahisa Sawada and Daisuke Komiyama (In German) pp. 83-85. On the stabilization of acetyl cellulose by treatment with organic liquids. M. Taniguchi. (In German) pp. 85-86. On the solubility curve of the high molecular weight compounds. M. Taniguchi. (In German) pp. 86-87. Acetylation of cellulose with the use of sulfo acetic acid as catalyst. I. Sakurada and M. Taniguchi. (In German) pp. 87-88. Production of the primary acetone-soluble acetyl cellulose with the use of a large amount of sulfuric acid. M. Taniguchi (In German) pp. 88-89. Styrene substitutes and their polymers. (I) Methyl styrene and its polymer (In English) p. 89. The behavior of cellulose in alkaline solutions (XXI). Addition to communications IV and XI. Gi-iti Saito (In German).

THE FAMILY OF PHOSPHATES

By Paul Logue
Phosphate Division
Monsanto Chemical Company

Production Methods
In Two Parts: Part Two

Today, most of the phosphates, other than those used for fertilizers, are produced by processes beginning with elemental phosphorus from electric furnace operations. Here is the story of production methods in the industry from every angle possible.

PHOSPHORUS, produced in its elemental form from phosphate bearing ore is the mother element of the family of phosphates. Today most of the food grade phosphoric acids and phosphates, other than those used for fertilizers, are produced by processes beginning with elemental phosphorus from electric furnace operations.

In the electric furnace method the first step in the production of phosphorus begins with the mining of phosphate-bearing earth, designated as "rock." This operation involves the handling of tremendous tonnage of heavy, bulky raw material. To accomplish this, earth digging equipment of tremendous capacity is utilized, including drag lines and trailer-trucks that hold twelve tons in a load.

The ore mined in this way consists of a gravelly earth that has been deposited from three to fifty feet beneath the surface and lying between ridges of limestone. This matrix varies in phosphate content and the two grades, low and medium, are prepared for processing in different ways.

The higher grade matrix is run through a crusher to reduce the larger particles and stored for processing. The lower

The Author

grade material is concentrated to bring up its average phosphorus content. Concentration is carried out by a system of washers, classifiers and thickeners, which removes some of the clay and other fine-particled material. The result of this treatment is a concentrate which approximates the higher grade matrix in phosphate content.

The crushed higher-grade matrix and washed concentrate are stored in roofed-over enclosures from which they are fed to the sintering operation. Sintering is a key point in the process since it makes possible the use of relatively low-grade and finely divided raw materials in electric furnace production by forming the gravelly matrix into porous, uniformly sized particles ready for mixing into the furnace charge.

The charge for the furnace consists of a carefully measured mixture of sinter, coke and in some cases silica sand. The sinter is, of course, the source of phosphorus; the coke provides carbon as a reducing agent; and the silica is added under certain conditions to insure slagging of undesirable components.

This charge or furnace stock is fed into the electric furnaces. These are large closed vessels, fitted with electrodes through which the current is fed. In the intense heat of the arc formed between the electrodes, the stock melts and the carbon removes the oxygen from the phosphatic component of the charge, freeing elemental phosphorus as a vapor. This, mixed with carbon monoxide, passes off and through a hot water spray which condenses it. The condensed phosphorus is collected under water in a sump while the CO is carried away for use as a fuel in sintering and other processes.

Products of Furnace Operation

There are two other products of the furnace operation. Iron in the charge combines with phosphorus to form ferrophosphorus. This material, resembling gray iron in appearance, is cast into pigs. The silica-lime slag is also drawn off periodically and quenched.

Elemental phosphorus is a yellow or white waxy solid with a melting point of approximately 44° C. Its handling requires close precautions since it burns spontaneously in air and in contact with the skin it causes severe burns. From the production process it is pumped to storage tanks fitted with steam coils. In these tanks and in all handling operations it is kept continually under water.

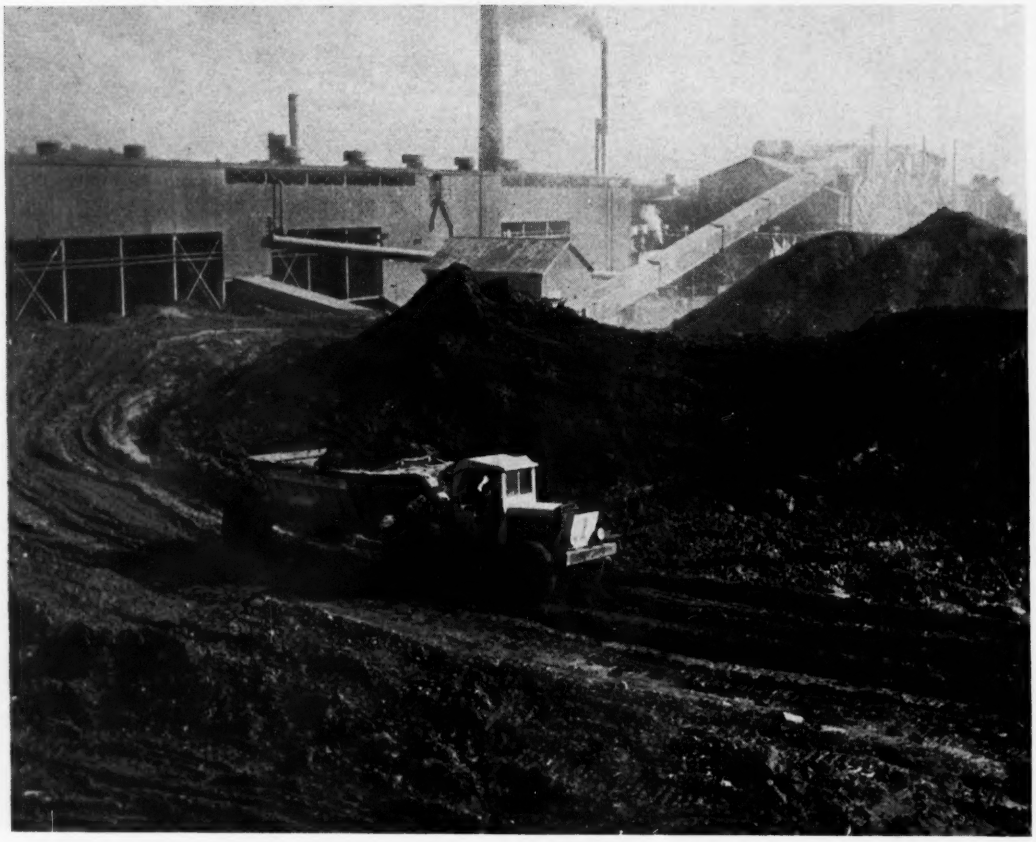
The availability of substantially pure elemental phosphorus (better than 99.9%) from the electric furnace production method has made possible notable improvements in the purity and uniformity of phosphoric acid. Even in the production of those phosphates where food grade quality is not necessary, it is now economically possible to use this high grade acid.

Phosphorus is burned in air to produce phosphorus pentoxide (P_2O_5). This compound, in vapor form, is hydrated to form phosphoric acid ($P_2O_5+3H_2O=2H_3PO_4$).

The calcium phosphates are products of

Make hay while the sun shines? Rain was actually falling when these haying pictures were taken on a Missouri farm. "Phosilage" is added to the silage at the silo. It acts as a preservative and adds nutritive value to the feed.

The men in the background are making up mud in the steel tank. Mud for well drilling must not be too thick or the hole will become clogged, too thin or it will not carry up the drill cuttings. Its viscosity is controlled by adding a mixture of phosphates and Quebracho bark.



Phosphorus Bearing Matrix, Monsanto, Tenn.

the reaction of phosphoric acid and lime. The degree of acidification is controlled by the relative proportions of the reactants added. These reactions are carried out in vessels equipped with suitable mechanical agitators.

Monocalcium Phosphate

With monocalcium phosphate, widely used as a leavening agent in baking powders and self-rising flours, particle size and shape is of importance in controlling free flowing and blending characteristics. The powder is, therefore, produced from the reacted slurry by a spray drying process. Other methods involve the reaction of dry lime with phosphoric acid or its crystallization from an acid solution.

The Ammonium Phosphates

The ammonium phosphates are products of the reaction of phosphoric acid and ammonia, the degree of neutralization determining whether monocalcium or diammonium will result.

On a tonnage basis, the sodium phosphates are the most important of the phosphate salts. Disodium phosphate produced by the reaction of phosphoric acid and soda ash, and monosodium phosphate produced by the reaction of different proportions of the same two materials can be considered as intermediates in the manufacture of the rest of the group. Trisodium phosphate is produced from the reaction of disodium in solution with sodium hydroxide followed by crystallization, centrifuging and drying of the resultant crystals.

Tetrasodium pyrophosphate is obtained by a condensation process carried out under high temperature.

PROPERTIES OF COMMERCIALLY AVAILABLE PHOSPHATES—TYPICAL VALUES

Property Molecular Formula Properties of Commercial Grades 75% H_3PO_4	*Phosphoric Acid* H_3PO_4	*Mono Ammonium Phosphate* $NH_4H_2PO_4$	*Di Ammonium Phosphate* $(NH_4)_2HPO_4$	*Mono Calcium Phosphate* $CaH_4P_2O_8.H_2O$	*Di-Calcium Phosphate* $CaHPO_4.2H_2O$	*Tri Calcium Phosphate* $Ca_3P_2O_8.Ca(OH)_2$	*Mono Sodium Phosphate* NaH_2PO_4	*Di Sodium Phosphate* Na_2HPO_4	*Tri Sodium Phosphate* $Na_3PO_4.12H_2O$	*Tetra Sodium Pyro-Phosphate* $Na_4P_2O_7$	*Sodium Acid Pyro Phosphate* $Na_2H_2P_2O_7$
Appearance	Colorless liquid	White crystals	White crystals	White cryst. powder	White powder	White powder	White powder	White powder	White crystals	White powder	White powder
Apparent Density g/cc.	1.575	0.96	0.90	0.980	0.870	0.29	0.78	0.67	0.89	0.69	1.08
% P_2O_5	54.5	61.4	54.0	55.7	41.5	39.6	58.7	49.0	18.6	53.3	63.9
% NH_3	...	14.8	25.3	...	..	...	...	...	...	...	...
% CaO	...	...	...	23.4	32.9	51.5	...	...	...	...	...
% Na_2O	...	...	...	...	...	...	25.6	42.8	26.7	46.55	27.8
Acidity % Na_2O equiv.	47.5	26.7	...	30.6	8.1 *	...	25.8	...	...	...	24.0
Alkalinity % Na_2O equiv.	...	...	23.2	...	18.25*	39.8*	...	21.45	18.7	23.16	...
pH of 1% Solution @ 25°C.	1.8	4.3	7.7	4.1							
Solubility in 100 g H_2O @					5.1	7.1	4.6	8.7	12.1	10.2	4.2
25°C. - g	0	41.5	72.0	1.8	0.5	0.003	96.0	12.3	14.8	6.4	22.0

* *Back titration using excess reagent with heat.*

Above, Oil Well Drilling Mud Using Tetra Sodium Pyrophosphate. Left, Phosphorus-Bearing Matrix at the Mines, Monsanto, Tennessee.

From phosphoric acid and soda ash there is derived through progressive steps of heating, dehydration and molecular association, sodium acid pyrophosphate, and sodium metaphosphate.

Production Organic Phosphates

Organic phosphates may be obtained by the reaction of alcohols with phosphorus pentoxide or phosphorus oxychloride, the former method being suitable for the production of the acid esters, while the neutral esters such as triphenylphosphate require the latter procedure. The production of thiophosphates requires phosphorus pentasulfide.

American Chemical Society Directors Take Action On Subject of Unionization

Chemical Industries publishes the complete statement on the subject of unionization of chemists and chemical engineers as issued recently by the Board of Directors of the American Chemical Society.

BECAUSE of efforts to compel chemists and chemical engineers to join labor organizations in order to obtain or retain employment in certain plants, the Board of Directors of the American Chemical Society has given consideration to the broad problems of employment in the field of chemistry.

So that the position of the Society may not be misunderstood, the Board of Directors issues the following statement for the more complete information of our membership:

The Society has taken no stand against "collective bargaining" for professional men when such bargaining is not controlled by nonprofessional groups and where the bargaining unit is composed exclusively of professional men.

The Society condemns no one of its members for joining any noncoercive labor union so long as he does so voluntarily.

The Society, however, is unalterably opposed to the forcible inclusion of professional men in bargaining units dominated and controlled by nonprofessional employes, whether that inclusion be brought about by economic pressure upon an employer, by intimidation of the professional employe, or by operation of either state or federal law.

The Society will bend every effort to maintain for all its members the "right to work" and the "right to employment and promotion" on the basis of worth and merit.

Accordingly the Board of Directors goes on record as opposed to affiliation of its members with any organization that conditions promotion primarily on the basis of "seniority" or that insists that they join any labor organization where they would be in a minority, with no power to protect themselves while paying "protection" thereto as an essential to the privilege of earning a livelihood and with their wage scales negotiated by those whose selfish interest would require that benefits be sought for the larger number of nonprofessional workers to the detriment of the relatively few professional employes.

Letters from some members, supported by facts and intelligent argument, claiming that conditions during the depression and under the emergency have secured for tradesmen and laborers, under union leadership, advances in income not enjoyed by trained professional men often directly associated with the former have been given consideration.

Already a number of our more progressive employers have made surveys of their personnel and have taken, or propose to take, corrective measures.

In order that some logical conclusion may be reached, it seems wise to consider the distinction between professional and nonprofessional employes engaged in chemical work in order properly to differentiate between professional and nonprofessional workers.

At the present time there are a large number of technicians employed in the field of chemistry.

The term "Technician" may be applied to routine workers, trained in the laboratory but with no special education or mental proficiency in chemistry and allied sciences. Normally they will be individuals with secondary school education only, or perhaps ones who have failed to acquire a baccalaureate degree through lack of funds, insufficient effort or capacity, or attendance at underequipped educational institutions. These are almost always paid wages on the hourly basis and are often included in labor union agreements. No proper objection can be raised to their inclusion in a bargaining unit composed of employes doing various kinds of skilled, semi-skilled or unskilled work.

The two groups of employes which should not be subjected to forcible inclusion in a heterogeneous bargaining unit are those who have received degrees in chemistry or chemical engineering and are engaged in these fields, either as chemical internes or as professionals.

The term "Chemical Interne" may be applied to those who are essentially in the final qualifying stage for their life work in the field of chemistry. They have received their baccalaureate degrees with majors in chemistry or chemical engineering, have proved their proficiency not only in chemistry but also in mathematics, physics, modern languages, etc. They are acquiring thereby the necessary training and experience to qualify for full professional status or standing. Those in industrial corporations are engaged in professional work on problems confidential to management, whether their work be control, research or development.

The term "Professional" should be applied only to those who have the baccalaureate degree, or its equivalent by specific accomplishment, and who, having been graduated from institutions approved by the American Chemical Society, have had at least two years of postgraduate training in chemistry or chemical engineering in institutions of like grade or have for an equal period obtained experience in chemical work. For graduates of other educational institutions five years of postgraduate training and/or experience subsequent to the baccalaureate degree should be required. These are the minimum requirements for full professional membership in the American Chemical Society.

The Board of Directors has heretofore hesitated to make any suggestions on the matter of adequate compensation. On the whole our educational institutions and chemical corporations have realized the value of brains and have compensated employes accordingly. The chemical profession as a whole is on a level with any other profession in material return. There are today in our profession, as in many others, individuals whose compensation is high, indeed almost fabulous, and others who are grossly underpaid. There are many who, even in the higher brackets, earn more than their income. There are some, even in the lower brackets, who are not worth their hire, and who should, for their own sakes and for the reputation of the profession, seek other more fitting fields for a livelihood.

In spite of this generalization there has come to the attention of the Board of Directors evidence that there are today many cases where worthy professional men with years of study and training are grossly underpaid and are receiving less compensation than men without any specialized education employed in many of the trades and crafts.

In the opinion of the Board of Directors, the time has arrived when it must publicly suggest to all employers of chemists and chemical engineers that they review with care their employer-employe relations in this line of endeavor. The American Chemical Society stands ready through a carefully chosen Committee on Economic Status to act in an advisory capacity both to employers and to employe groups of its members and, if deemed helpful, to publicize its findings. Enlightened management will, it is believed, welcome consultation with such a committee composed of carefully chosen individuals.

As a beginning, the Board of Directors suggests that all worthy chemical internes and professionals when engaged in professional work be paid on a salary and not on an hourly basis.

The extent of training, experience and capacity, as well as individual personality and merit are factors that must be considered when employing one to engage in professional work. Bearing these factors in mind, as well as the objects of this Society, and the requirements for membership therein, the Board ventures to make the following suggestions to employers for their consideration in respect

(Continued on page 504)

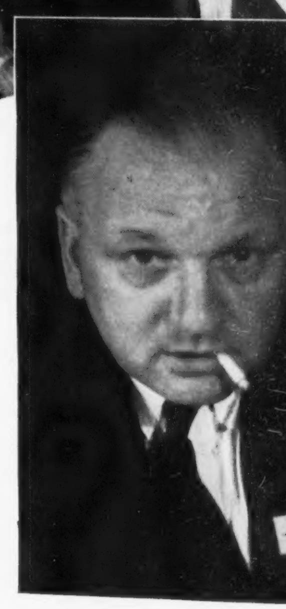
American Chemical Society 102d Meeting Held at Atlantic City, September 8th-12th

Five thousand (or was it more?) chemists and industrialists gathered at Atlantic City last month for the 102d meeting of the American Chemical Society. An ambitious 5-day program which included the presentation of about 600 papers described chemistry's contributions to industry, public health and other fields vital to national defense. On this and the following two pages are staff photographs of the activities. For other photos and a detailed staff report of the meetings see pages 464, 465 and 478.

→

Right, Dr. W. L. Evans, Ohio State University, A. C. S. president, pauses at the banquet table to discuss the program.

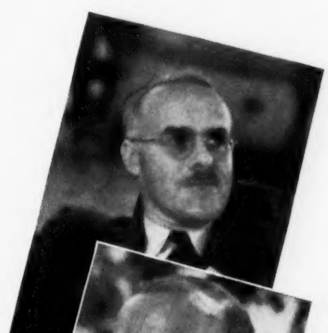
Above, J. Press and Dr. M. Merlub-Sobel, both of Virginia Carolina Chemical.



Above, left to right, Coleman Caryl, American Cyanamid's Stamford labs.; Dr. August Merz, Calco Division, American Cyanamid; Dr. A. P. Beardsley, also of Calco. Right, J. H. Babcock, Hooker Electrochemical Co.

Above, left, Major-General William N. Porter, Chief, Chemical Warfare Service, U.S.A., principal speaker at subscription dinner Sept. 9; above, right, Dr. Samuel C. Lind, former A.C.S. president.

Below, left to right, Carl Minnig, vice-pres., Continental Carbon; Mrs. Tom Callahan; Gene Nesbit, Continental Carbon; Betty June Wishnick; Tom Callahan, Wishnick-Tumpeer, and Robert Wishnick, Wishnick-Tumpeer.



←

Left, top to bottom, Leo V. Steck, Shell Development, Emeryville, Calif.; Dr. Gustav Egloff, Universal Oil Products; Dr. George Barsky, chemical consultant.

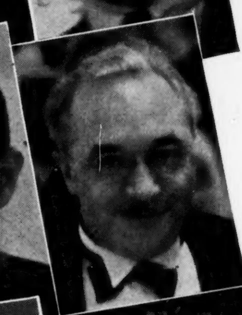
More photos on next pages. →

Some of the 5,000 at the ACS

Fathers and sons at the meeting. Left, Arthur D. Camp, Dorr Co., and his son, Richard C. Camp, now of Monsanto. Below, Walter A. Schmidt, gen. mgr. Western Precipitation, Los Angeles, A.C.S. director, and his son, Malcolm A. Schmidt, Western Precipitation.

Left, Dr. J. H. Ferguson, Johns-Manville (N. J.), and Dr. G. Thiessen, Koppers Co., Pittsburgh. Below, J. D. Edwards, Aluminum Company of America, and Dr. H. V. Churchill, ALCOA, New Kensington, Pa.

Left, A. L. Peiker, Calco, and L. P. Moore, American Cyanamid. Below, Roger Adams, University of Illinois, and Dr. Marston T. Bogert, Columbia University.

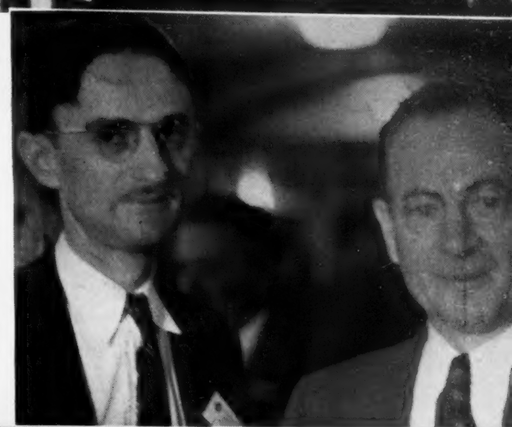


Above, top to bottom (read left then right), Dr. M. L. Crossley, Cyanamid director of research; Dr. J. F. Ross, J. T. Baker Chemical Co.; Dr. B. T. Brooks, chemical consultant; Louis Ehrenfeld, Pabst, Milwaukee; Dr. P. S. Roller, U. S. Bureau of Mines; Dr. J. W. E. Harrisson, La Wall & Harrisson, Phila.; H. L. Willard, Koppers Co.; Don Light, chief chemist, Ludlow Mfg. Associates, Springfield, Mass. Bottom photo, Elmer K. Bolton of du Pont, and Dr. James Bryant Conant, president, Harvard University.

CS

Atlantic City Meeting

Above, left to right, H. Robinette, E. A. Smith, L. Pruess (Terre Haute) and Walter Scheer (N. Y.) all of Commercial Solvents.

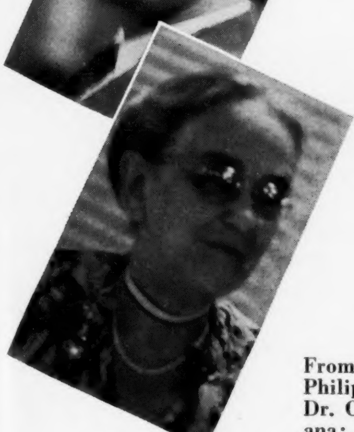


Right, E. S. Ritchie, Eagle-Picher Lead and Dr. E. W. McMullin, director of research, Eagle-Picher Lead.

Left, F. S. Lodge, National Fertilizer Assn., and Dr. R. G. Kreiling, Armour Fertilizer Works, Atlanta, Ga.

Right, Robert B. Semple, assistant development director, Monsanto, and Gaston F. Du Bois, Monsanto vice-president.

Left, Dr. Marion Gwynn and Logan Grupelli, National Oil Products Co., Harrison, N. J.



Right, Frank S. Low, Westvaco Chlorine Products; William Stericker, Philadelphia Quartz.

From top to bottom (left), Dr. S. F. Thornton, Royster Guano; Philip Mac G. Shuey, mgr. Shuey & Co., Savannah consultants; Dr. Cecil Brown, director of research, Standard Oil of Louisiana; Robert Swain, Cyanamid; bottom, Mrs. E. F. Smith, widow of the late Professor Edgar Fahs Smith, University of Pennsylvania.

Headliners in the News

Left, Arthur P. Kroeger, formerly assistant general branch manager of the Los Angeles office of Monsanto Chemical Co., who has been made assistant manager of sales in charge of intermediates at St. Louis. Right, Charles L. Fetzner who has been transferred from the San Francisco office of the company to the Los Angeles office to replace Mr. Kroeger.

Above, left to right, Edgar M. Queeny, president of Monsanto, whose new book "Cheechako" will be published by Scribners in November. Dr. Robert W. Cairns, assistant to the director of research, Hercules Powder Co., who is now director of the company's experiment station at Wilmington. Dr. Edwin F. Pike, recently appointed director of chemical research for Gelatin Products Co., Detroit. Dean R. Wilson, now purchasing agent of the Warren plant of Copperweld Steel. H. Tom Collord, president of the recently-established Protective Coatings, Inc., Detroit. (For other "Headliners" see news pages of this issue.)

Right, Coolidge Sherman, who has been appointed Eastern sales manager of Allegheny Ludlum Steel Corp., Pittsburgh. Extreme right, William F. Hoffman, vice-president of Irvington Varnish & Insulator Co., and Dr. Mortimer T. Harvey, technical director of Harvel Corp., research subsidiary of the company, who left recently on an airplane journey to Rio de Janeiro and the jungles of Brazil to arrange for new supplies of cashew nut shell liquid.

PLANT OPERATION AND MANAGEMENT

Gigantic Paint Mixers

H. K. Porter Co., Inc., Pittsburgh, recently announced the completion of three large paint mixers in the company's process equipment division. Two of them are shown here as fabricated for an automobile manufacturer. They are believed to be the largest ever manufactured. Construction is of plain steel, fitted with finger-type steel stirrers. Each mixer is 9 ft. in diameter, 18 ft. high overall with a capacity of 3,500 gallons.

DIGEST OF NEW METHODS AND EQUIPMENT FOR CHEMICAL MAKERS

HOW MONSANTO SOLVED

The Employee Restaurant Problem

By S. W. Allender
Assistant to the President, Monsanto Chemical Co.

Company restaurants, it is said, usually operate at a substantial yearly loss. But do they need to? No, says Monsanto and proceeds in this article to show why. Read how good old "common sense" did it.

ONE of the perennial headaches of industrial management is the problem of company restaurants and cafeterias. Nevertheless, the advantages are so great that management will usually worry along with industrial restaurants despite a mounting deficit and the fact that the department is a constant source of dissatisfaction.

One of the most important advantages of such a department is that it is the best method of exposing the management and supervisory staff to the rest of the personnel. The fact that the president lunches with department heads and subheads offers an opportunity for the exchange of ideas and contacts that is sufficient justification in itself for industrial restaurants.

The time-saving factor is another important advantage. In our own and many other industrial plants acceptable eating facilities are far removed from the plant locale. The time spent in going "uptown to lunch" often makes it difficult to schedule early afternoon meetings. Leaving company premises for lunch usually takes from one to two hours, whereas thirty minutes is sufficient time for lunch in the company cafeteria.

Another advantage is that it affords the opportunity to watch over the health of the employes. The beneficial effect of adequate and proper nutrition is reflected in the health records of our personnel.

Having decided to set up a restaurant, the first lesson to be learned, either by inquiry or experience, is that they usually operate at a substantial yearly loss. Our experience for ten years verifies that supposition. However, we grew tired of accepting this loss and determined to find the solution to our problem. Our new management succeeded in doing just that.

Our investigation first took into consideration the pay roll. To our own amazement we found that we could cut the pay roll in half and still operate with greater efficiency. By selling the secretaries, stenographers, and other office help on the idea of pinch-hitting during the busiest half hour in return for their lunch, we achieved two things: reduction of the restaurant payroll overhead, and "democratization" of the office force.

With all respect to dietetics and accountancy, our guiding factor in steering our cafeterias out of the red has been common sense. For example, the management discovered the demand and how much to charge for any particular item by the simple expedient of furnishing each counter waitress with a bag of dried beans As a portion of each item was sold, a bean was deposited in a jar labeled for each item. Thus, it was possible at the end of a day to determine how much money was taken in on each item and whether we could afford to serve any particular item.

Above, a section of the executive dining room. Below, a good view of the kitchen. (Note that boiled ham on the butcher's block.) Photo at top of page is the serving line in the office cafeteria.

By this method of checking, our food costs were definitely allocated to each item. When we found exceptional instances of our selling price being below the original market cost rather than raise the price we dropped the item from the menu. This was done chiefly because of our apprehension that any rise in prices in this stage of our reorganization would have created unfavorable reaction.

In regard to prices, after the first month of reorganization, the cost of food to the salaried force alone was reduced by $500. In part this was accomplished through the installation of a sandwich bar that helped to eliminate the deficit and at the same time enabled the employe to buy a more economical lunch.

Formerly employes spent from 25 to 30 cents for their lunches, but with installation of the sandwich bar where cube steaks, hamburger sandwiches, and ham and eggs were served, lunch costs for budget-minded employes were lower by ten or fifteen cents. Thus, we were able to maintain our policy of not raising the price of food.

Salesmanship played an important part in steering our cafeteria out of the red. By placing the sandwich bar in such a position that the employes could see the hamburgers, steaks and wieners on the grills, the popularity and sales of sandwiches grew tremendously.

One important problem was the standardization of portion. For example, it was found that the disproportionate servings of high-grade bulk ice cream was a direct source of loss. To remedy this, ready-molded ice cream bricks of the same quality were served and the variations were eliminated.

Following the line of least resistance, it would have been possible to reduce the quality of our food, thus lowering initial costs. However, it is our practice to serve nothing but Federal inspected meats and highest grade foodstuffs, as the dividends in employes' health and satisfaction compensate for any saving in costs that might be achieved through use of second grade foods.

Since the sole source of revenue in the cafeteria is income from lunches, this department is not charged with building space or rent. It bears its full share of all other overhead items, however, such as electricity, gas, water, ice, laundry equipment, and even air-conditioning.

For the comfort of personnel, our cafeterias are air-conditioned and, with the exception of the plant lunch room, are acoustically treated so as to eliminate noise and encourage conversation.

We were tempted several times to rent our space to concessionaires before we succeeded in pulling our cafeteria out of the red. However, after careful consideration, we rejected the idea for several reasons. Principally because of the concessionaires' need to operate at a profit, we feared the substitution of inferior quality food, as well as their paying salaries on our premises below salary standards.

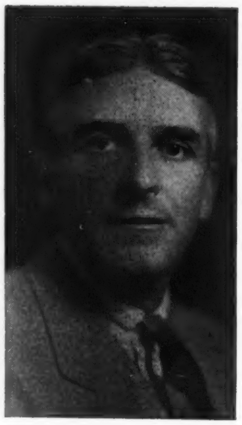
Our St. Louis restaurant serves both the general office and the St. Louis plant, operates 24 hours a day, seven days a week and serves over 1,200 persons daily. There is one large modern kitchen in connection with three dining rooms, the largest of which serves the plant force in four 30-minute shifts for the noon meal. The other two dining rooms serve the salaried office and laboratory personnel and department heads. Such a system naturally reduces the service force needed in the cafeteria and does not require as large a dining room.

The dining room for plant men serves a cafeteria style 28-cent plate lunch consisting of soup, cracker, choice of meat, choice of vegetables, potatoes, bread, butter and milk, tea or coffee. Sandwiches and individual items are also available. Directly opposite this room is the salaried force lunch room that also operates on the four 30-minute shift basis. Although cafeteria style, this room does not offer the plate lunch. All items are individually priced.

In conjunction with the salaried force cafeteria is the department heads' dining room with a seating capacity of approximately 60 people. A cover charge of 15 cents per meal is levied in this dining room to compensate for the expense of waitresses and linens. This charge makes no substantial contribution to the income, but tends to equalize dining room privileges and remove any idea the employes might have that the department heads are getting something for nothing. Individual menus are given to the patrons in this dining room, who then check off their desired items. The meals are charged to the personal accounts of the patrons, and the menus serve as records for determining the monthly billing.

The genuine interest and support of the management is the fundamental factor behind the success of the industrial restaurant. This does not mean only a financial interest, but support to the extent of assuring the cafeterial manager and staff that they have a free hand in buying to the best advantage. Reciprocity in purchasing should not be a controlling factor, as that alone can do much in keeping an industrial restaurant in the red.

A group of the Monsanto girls at lunchtime, office cafeteria and the sandwich bar, one of the most popular innovations.



Shipping and Container FORUM

By R. W. Lahey

Editor's Comment:

Maurice F. Crass Jr., Assistant Secretary of the Manufacturing Chemists' Association, is chairman of the Association's Container Standardization Committee. He has prepared the following outline of the aims and accomplishments of his committee.

To help the defense program and to assist the Industry to obtain containers for the shipment of their products, many of which are essential to the defense program, rank with the most important container and packaging jobs of the day. The work of the Container Standardization Committee warrants the active cooperation of all shippers.

CONTAINER standardization, always desirable from the standpoint of efficient and economic plant practice, has become an essential activity during the present emergency. With container requirements for the shipment of chemicals rapidly accelerating and with important shortages of container raw materials either imminent or actually here, it has become necessary to survey the entire chemical container field in an effort to effect package substitution, eliminate specialty sizes and types wherever possible, and take other steps designed to facilitate manufacture and procurement of essential containers and container materials.

To this end, the Executive Committee of the Manufacturing Chemists' Association set up a Container Standardization Committee last June, consisting of the Chairmen of the several M. C. A. Technical Committees; to make recommendations to the industry concerning container simplification and standardization, following completion of surveys covering the commodities and/or packages concerned. Acceptance by the chemical industry of the Committee's recommendations to date has been practically unanimous.

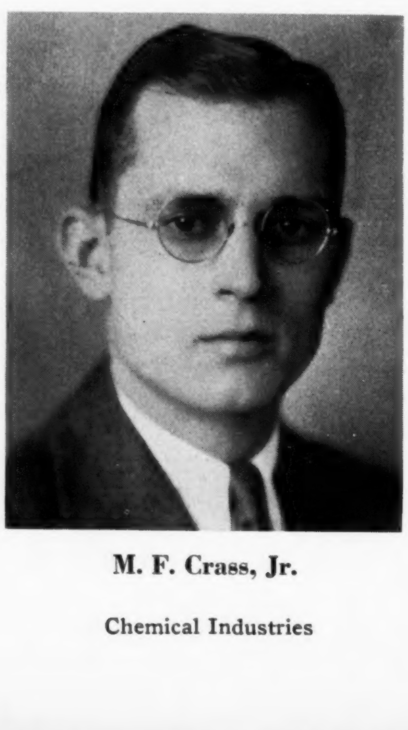
Activities of the Container Standardization Committee up to the present time include the following items:

1. *Carboys.* Following development of the 13 gallon M. C. A. standard carboy in 1934, the industry standardized on this size, with the exception of a small number of shippers who continued using the 12 gallon type. Faced with an appreciable loss of production at the bottle plant because of size changeovers, the Committee has recommended to 12 gallon bottle users that they specify only the 13 gallon type on future orders. In addition to facilitating additional bottle production, universal use of the 13 gallon standard type will provide approximately 8⅓ per cent. additional carrying capacity per carboy per trip.

2. *Sodium Phosphates.* The Committee has recommended that shippers of TSP and related compounds eliminate burlap bags and standardize on a 5-ply paper bag of 1/50, 2/75 asphalt laminated, 1/60, 1/70 draft minimum construction. Extensive transportation, drop, and storage tests previously conducted by an M. C. A. Technical Committee had thoroughly proven the practicability of this bag for the shipment and storage of these products. This package has now been generally adopted by the industry.

3. *Steel Drums.* Two questionnaires have been sent out by a special sub-committee, asking for detailed information on sizes, types, and numbers of drums used for both solid and liquid products, together with internal protective coating requirements, etc. Recommendations for standardization and simplification will be reported by the Committee in the near future.

4. *Other Items.* The Committee has considered or is now considering additional studies relating to fiber drums, alkalies, resin molding powders, aluminum sulfate, alums, and processed sulfur.



M. F. Crass, Jr.

Taggart Corporation To Build New $500,000 Multiwall Paper Bag Plant

Roy K. Ferguson, president of the Taggart Corporation recently announced an expansion program designed to aid in meeting defense requirements for heavy duty paper bags for industrial shipments of chemicals, food products and building materials. Mr. Ferguson said that arrangements had been completed for the construction of a modern, fully equipped factory for manufacturing heavy duty kraft paper bags. The new plant, which will cost approximately $500,000, will be erected adjacent to the paper mills of the Chesapeake-Camp Corporation at Franklin, Virginia, who will spend $700,000 in equipment to manufacture kraft paper to the specifications of the Taggart Corporation. This paper will be used by Taggart in making the heavy duty bags in the new plant, which will have a daily capacity of 250,000 bags.

The Taggart Corporation was established in 1866 in Watertown, New York, as a pioneer manufacturer of paper bags. Since that time the paper mill and bag factory at Watertown have been enlarged, and additional paper mills have been established in Northern New York at Oswego, Carthage and Herring and bag factories at Oswego and Carthage. Today the four Taggart plants are producing approximately 265 tons of bag kraft per day, and the three bag factories in excess of twelve million bags per month. This bag production will be greatly augmented by the new facilities at Franklin, Virginia.

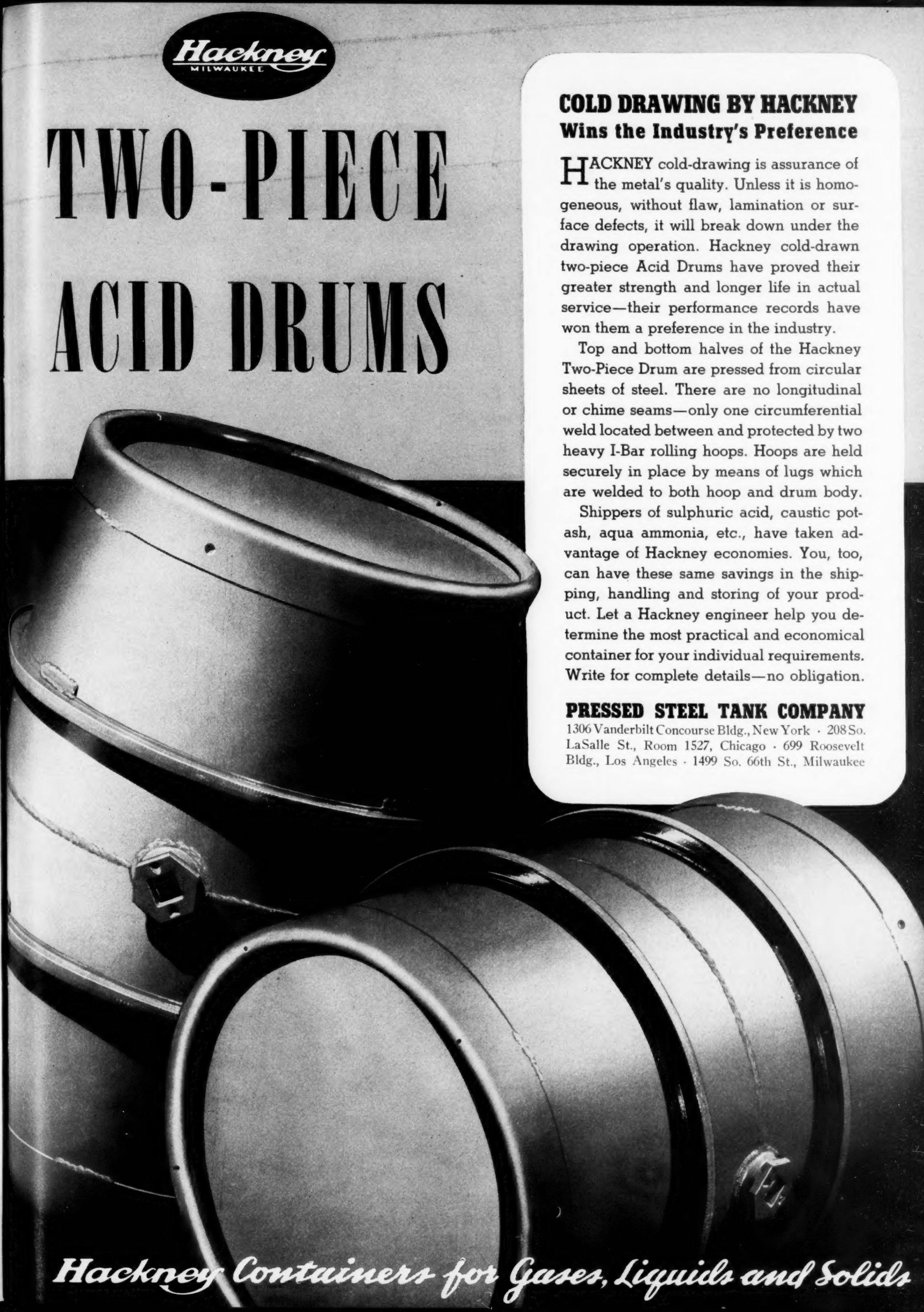
Conserve Your Burlap Bags

A suggestion that, wherever possible, printing be eliminated on bags made of burlap and other textiles so that they may be used over again was made today by the Division of Civilian Supply, Office of Production Management.

Bags are used extensively for packaging by defense and civilian industry and especially for agriculture products. Shortages have developed that make it necessary to conserve bag supplies to the greatest degree possible.

The presence of printing on bags prevents their re-use in many cases. In instances where such printing is required

(*Continued on page 474*)


Hackney
MILWAUKEE
TWO-PIECE ACID DRUMS
COLD DRAWING BY HACKNEY
Wins the Industry's Preference
HACKNEY cold-drawing is assurance of the metal's quality. Unless it is homogeneous, without flaw, lamination or surface defects, it will break down under the drawing operation. Hackney cold-drawn two-piece Acid Drums have proved their greater strength and longer life in actual service—their performance records have won them a preference in the industry.
Top and bottom halves of the Hackney Two-Piece Drum are pressed from circular sheets of steel. There are no longitudinal or chime seams—only one circumferential weld located between and protected by two heavy I-Bar rolling hoops. Hoops are held securely in place by means of lugs which are welded to both hoop and drum body.
Shippers of sulphuric acid, caustic potash, aqua ammonia, etc., have taken advantage of Hackney economies. You, too, can have these same savings in the shipping, handling and storing of your product. Let a Hackney engineer help you determine the most practical and economical container for your individual requirements. Write for complete details—no obligation.
PRESSED STEEL TANK COMPANY
1306 Vanderbilt Concourse Bldg., New York · 208 So. LaSalle St., Room 1527, Chicago · 699 Roosevelt Bldg., Los Angeles · 1499 So. 66th St., Milwaukee
Hackney Containers for Gases, Liquids and Solids

by law, it is suggested that the requirements be met by use of appropriate tags.

Consumers are urged either to return bags to the seller of the merchandise or to sell them to recognized second-hand dealers, thus making them available for re-use.

Issues Linings Insertion Chart

Arkell Safety Bag Co. recently issued a chart on the proper insertion of barrel liners. This excellent job is reproduced because it is of interest to all users of slack barrels.

Another commendable feature of these instructions is that it is printed in poster form so that it can be prominently displayed to those workmen engaged in the barrel packing operation. Often valuable data of this type is published in letter or pamphlet which finds its way into some desk drawer and never reaches the proper individuals.

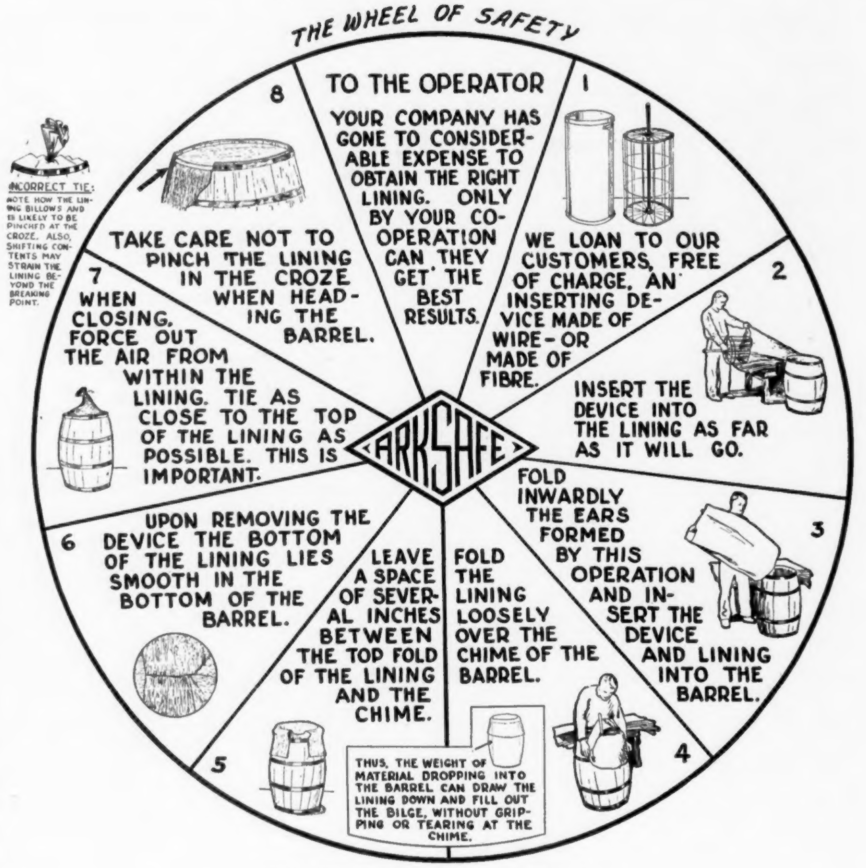
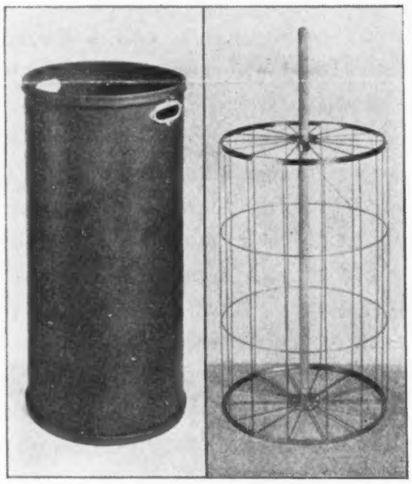


Chart issued by Arkell Safety Bag Co.



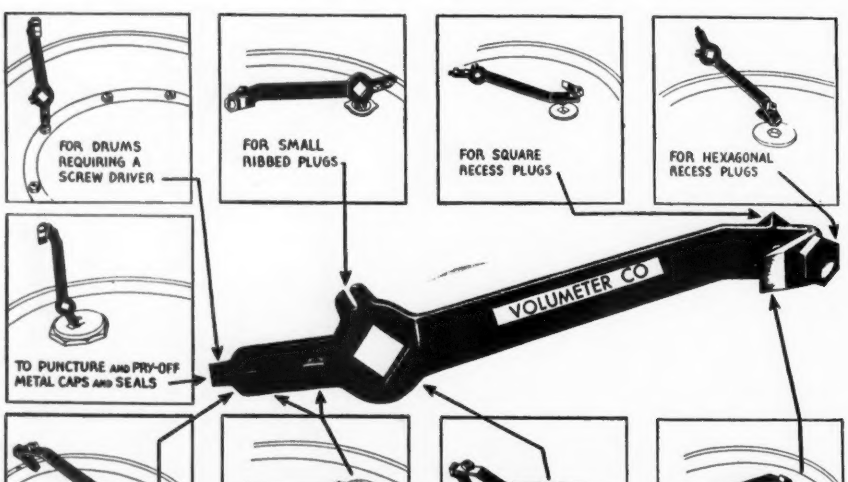
Inserting Devices

Drum Wrench

Volumeter Co., Buffalo, N. Y., have a drum wrench which has been designed to open drums which are equipped with a large variety of plugs as well as cap seals. This opener is called the Nine-in-One as it has nine primary applications as shown by illustrations above. It will, however, also be found convenient for other odd uses. The screw driver end will open drums of grease where slotted square head cap screws are used, and this end is also used for puncturing seals. Drums with square or hexagon recessed plugs, square head plugs, or ribbed plugs are quickly and easily opened.

This tool is so designed that clearance is allowed for the hand for any of the various applications, thereby eliminating the possibility of skinned knuckles. It can be burnished hot galvanized if desired.

The attending illustrations show several of its many uses.

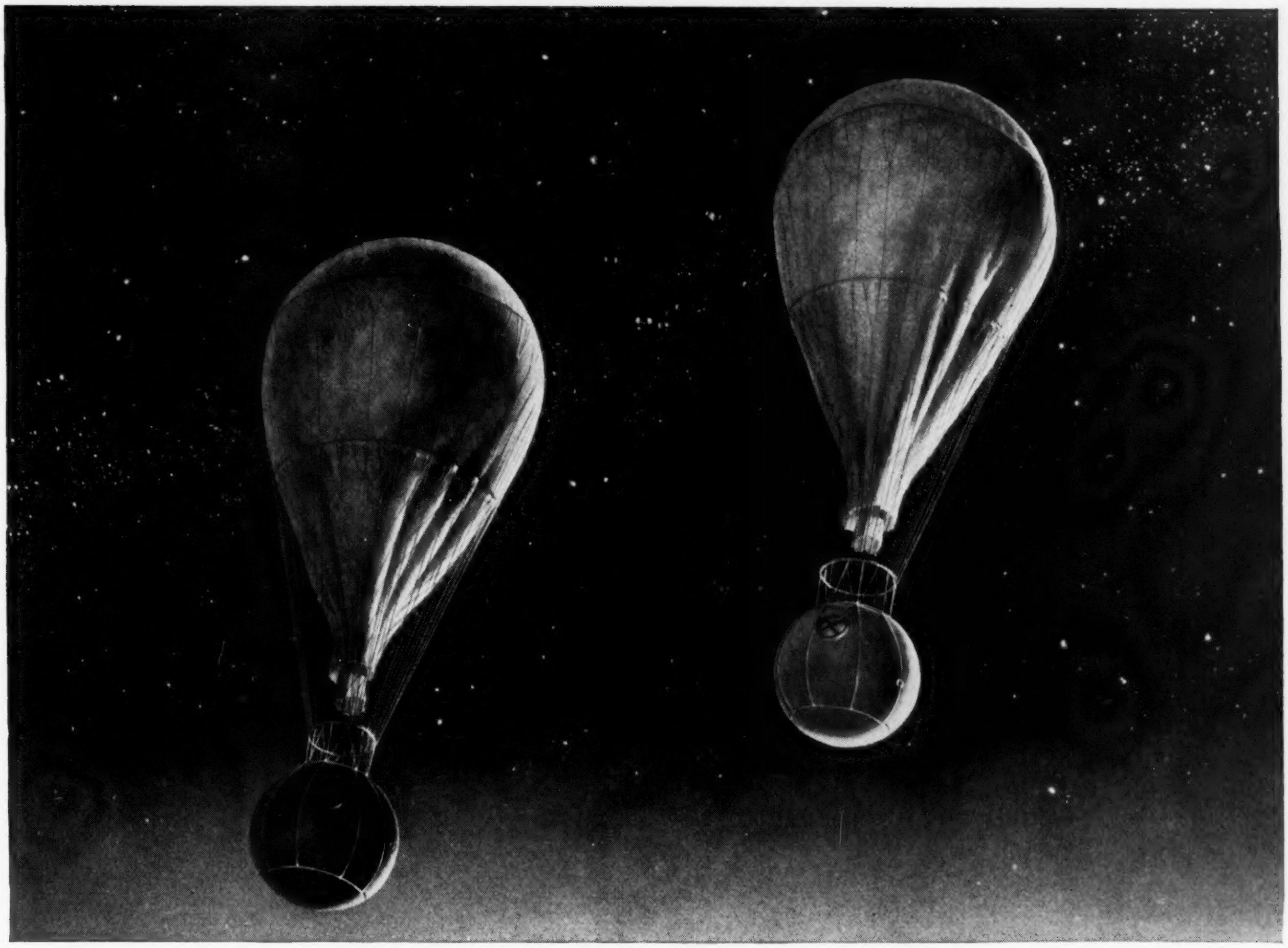


Empty Drum Accidents

A supposedly empty drum, lying along the side of the road, may often spell danger to the curious passer-by. For example, recently in Portsmouth, Ohio, a youngster came upon such a drum which had previously been used for transporting gasoline. He unscrewed the drum plug and held a lighted match to the opening—just to see what was inside. An explosion resulted—badly burning his face and causing a possible impairment of eye sight. A similar incident a few months ago, caused disfigurement for life.

Both of these occurrences are typical of what happens from time to time and often results are more serious.

When drums containing dangerous materials are emptied, they should be stored in some place where children and the public cannot get to them. If they must be left in public places, precautions should be taken to prevent the possibility of such accidents.



Which is the better package?

MILES above the earth a stratosphere explorer ran into a strange packaging problem. He was making his first balloon flight, safely encased in a black gondola. Outside, in the cold silence, the temperature was 75 degrees below zero.

But inside it was hot—100 degrees above!

What caused the terrific heat? The scientist had an idea. He made his second flight in a *white* gondola. But this time he suffered in below-freezing temperature. Why did he perspire in one gondola and shiver in the other? A physics book will tell you that a black surface absorbs the most heat, a white surface the least.

Which was the better package? Neither. Because neither was the *right* package.

Here's one case, it seems, where businessmen have the advantage over explorers. For when a manufacturer wants to find the right package, he has the help of modern packaging research.

Continental offers three complete and basic packaging services—research, development, and design.

Our packaging experts have had many years of experience in producing and improving packages, creating convenient, colorful, eye-appealing containers. Moreover, they are experts in developing practical packages that are more economical, easier to fill, pack, ship, sell, and use.

What kind of packaging problems come up in *your* business? Do they call for trained research? Whatever they are, call for Continental. We'll be glad to come around and help.

CONTINENTAL CAN COMPANY

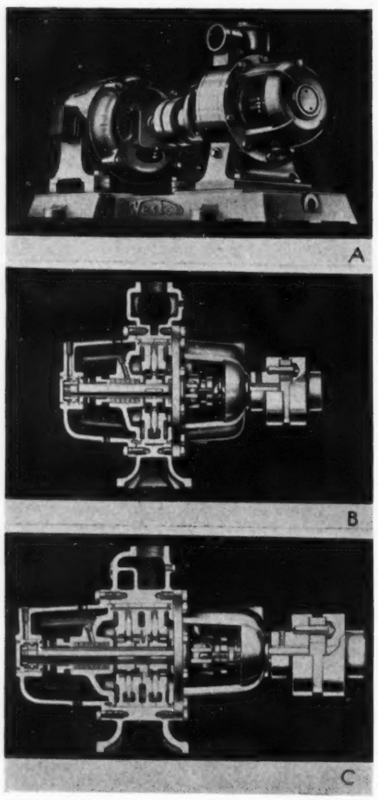
New York   Chicago   San Francisco   Montreal   Toronto   Havana

NEW EQUIPMENT

New Line of Pumps QC 138

Micro-Westco, Inc., have just announced a new series of single and two stage Turbine Pumps incorporating an improved type of patented renewable liner. This new feature is said to minimize shut-down losses and production delays because the liners, forming the liquid channel within the unit, can be renewed (along with the impeller), providing complete "stand-by" service at about ¼ the usual cost of a duplicate unit.

The separate liner design also guards against premature obsolescence by permitting the pump capacity and range to be altered, within reasonable limits, in the field. This alteration is accomplished, without disturbing the suction or discharge lines, by replacing the liners with a different set and slipping a new, matching impeller into position.



Other constructional advantages include (1) double ball bearing construction for maximum operating ease and longer life, (2) a top discharge preventing vapor lock, (3) a stainless steel shaft and "free-floating" impeller to eliminate seizing caused by extreme temperature variations, (4) extra deep stuffing boxes that reduce the need for frequent repacking, and (5) balanced bearing arms which minimize shaft misalignment.

Designed especially for high-head low-capacity work, these pumps are built not only for conventional service but in addition, are engineered to meet the many industrial applications requiring high pressure performance. For example, single and two stage pumps, with 5" impellers, will develop pressures up to 150 pounds and 300 pounds per sq. in. respectively at 1750 R. P. M. This wide range operation makes these advanced pumps excellently suited for brine circulation, steam service, liquid transfer, filtration, air conditioning, beverage and food (liquid) pumping, booster service, spray equipment, washing machines (industrial), water supply systems, laundry and dry cleaning work, etc.

Portable Mixer QC 139

The design of this new portable mixer, offered by the Alsop Engineering Corp., permits greater flexibility in the positioning of the propellers, by means of a swivel clamp which allows them to be placed in any part of the tank to get the best mixing action.

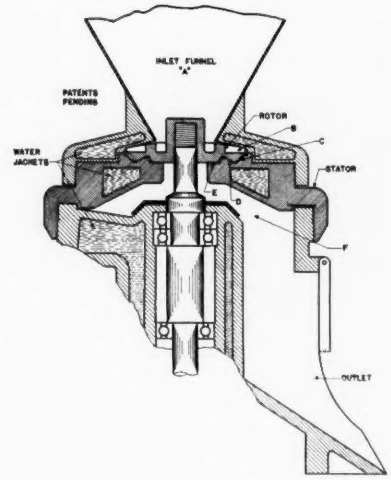
The mixer is made in ¼ to 5 H. P. and can be clamped to any type of container, and moved from one to another for different mixing jobs.

Mixers can be supplied to provide for any speed range needed.

When used in explosive atmospheres they can be supplied with explosion proof motors.

Colloid Mill QC 140

A new "paste type" colloid mill recently introduced by The C. O. Bartlett & Snow Company, adapts to the producing of heavy colloidal dispersions the triple proccessing action which has been found satisfactory for materials in the lighter range. This new machine is said to minimize aeration and foaming, and to produce excellent disintegrations and dispersions of materials such as ointments, creams, soaps, clay slurries, paint, printing ink, paper and leather coatings, rubber compounds, textile finishes, grease, paste and a variety of other semi-solids.



Referring to the accompanying diagram, material enters through the large and direct inlet "A" and encounters immediately the vanes on the top of the rotor "B" which premix the material and carry it to the periphery of the rotor at high pressures, forcing it downward and then upward between the machined surfaces of the rotor and stator, "C" and "D" on the diagram, the first and second processing actions,—then crowding it into constantly smaller areas as it approaches the center, and forcing it across the flat area "E" between the rotor and stator, the third processing action,—to be discharged through the steep sloped outlet designed to assure the ready discharge of the material from the machine to a container.

The gap between the rotor and stator is adjustable to and calibrated in 1/1000 of an inch. Adjustment can be made either before or while the machine is in operation and the stator locked in position with the desired gap. The rotor and stator can be furnished in whatever material is best suited to the material being processed.

Chemical Industries
522 Fifth Ave., N. Y. City.

I would like to receive more detailed information on the following equipment: (Kindly check those desired.)

QC 138 **QC 139** **QC 140**

Name ....

Title .... **Company** ....

Address ....

NEW CHEMICALS FOR INDUSTRY

Another use for plastics—in softening of light. Different colored strands of tenite, a shatterproof plastics, wound into coils and fitted over fluorescent tubes add warmth and color to light. Plasti-coils manufactured by Schwab & Frank from tenite, product of Tennessee Eastman, and extruded by Detroit Macoid Corp.

Digest of Chemical Developments in Converting and Processing Fields

THE NATION'S CHEMISTS REPORT

Staff Report

When 5,000 of the country's leading chemists, engineers and executives gather for a meeting, important things are bound to happen. Here is a complete report of some of the more important highlights of the 102d meeting of the American Chemical Society at Atlantic City Sept. 8-12

THE 102nd Meeting of the American Chemical Society, held at Atlantic City, September 8-12, probably will be remembered more in later years by the 5000 members in attendance because of the formal and informal discussions which took place on the absorbing subject of unionization of chemists rather than because of any technical advances reported in the six hundred-odd papers that were presented before the 18 professional divisions. The critical period through which the country is passing calls for a self-imposed censorship on technical information that may have possible disastrous repercussions later on.

This does not imply that there is any slacking in America's program of research and particularly so in so far as applied research is concerned. In this latter field the need is much greater since many substitutes must be found, new processes developed and new products made quickly available to supply the requirements of the greatest industrial mobilization the world has ever witnessed.

The 102nd meeting duplicated in one respect the trend of the past two years. It is quite evident that an ever-increasingly larger part of the programs are being given over to reporting advances in medicinal chemistry, nutrition and the development of newer and more powerful pharmaceuticals. In the industrial chemical field some of the more important highlights can be briefly summarized for the busy readers.

A New Neoprene Rubber

This new product, described by D. F. Fraser and F. L. Yerzley, of the Rubber Chemicals Division of Du Pont, combines the desirable qualities of natural rubber and the oil-resistant qualities of most synthetic rubbers. Up to the present, all known types of synthetic rubber have become hard and brittle when exposed to sub-zero temperature, but this new type of neoprene is as "freeze resistant" as rubber and at the same time oil resistant.

Principal use for this material, it was stated, is expected in automobile and airplane engines where low temperatures may be encountered. Since new types of planes are designed to operate at extremely high altitudes where temperatures may be as low as 70° below zero, and since many automobiles are subject to temperatures of 40° below zero, during winter weather, Neoprene Type FR, as the new product is called, should be invaluable in reducing maintenance costs. The product is now in limited production.

The Situation in Synthetic Rubber

At least two of the several synthetic rubbers developed within recent years can be satisfactorily used in the manufacture of automobile tires, if supplies of natural rubber should be shut off, E. R. Bridgwater, Manager of the du Pont Rubber Chemicals Division, stated before the Division of Rubber Chemistry's informative symposium "On Rubber for defense."

"Ten years ago," he said, "a complete cessation of supplies of natural rubber would have stopped the wheels of most, if not all, of our industries; but since then our rubber manufacturers have adapted synthetic rubbers to thousands of uses

THEIR PROGRESS IN MANY FIELDS

for which they have been found superior to the natural product.

"In so doing they have acquired a background of experience that will enable them to use one or another of the available synthetics for practically every product now made of natural rubber, if the need to do so should arise."

While the total production of general-purpose synthetic rubbers during the current year will be only about 1.5% of our crude rubber consumption, the future looks a little brighter, said Mr. Bridgwater. By the end of next year, he said, this country will have a capacity for producing at least 5800 long tons per month of such synthetic rubbers, including that produced in the four government-owned plants now under construction.

One-Tenth Requirements

This production, he said, will be about 10 per cent of the country's total normal rubber requirements. He added, however, that developments are now under way which might materially increase that figure.

Mr. Bridgwater emphasized that in order to increase production of any chemical product, much more is involved than merely constructing new plants in which the particular product is made. Facilities must also be provided for producing the necessary raw materials and furnishing power and other essential services.

The cost of providing such facilities cannot be determined accurately, he said, with the consequence that it is not possible to tell exactly how much it would cost further to expand our production of synthetic rubber to meet all needs.

He indicated, however, that in order to provide a tonnage equal to half our present natural rubber consumption, a total investment of the order of half a billion dollars might be required.

"To provide even such a huge sum would perhaps not be difficult," he said, "but to provide the skilled labor, highly-specialized equipment, and construction materials that the money would buy would obviously require serious sacrifices in other directions."

Chlorine and Salt Cake from Salt and Sulfur?

Undoubtedly the current serious shortage in chlorine prompted considerable newspaper publicity for a suggested new process for manufacturing chlorine and salt cake from salt and sulfur proposed by Hixson and Tenney of Columbia's department of chemical engineering.

The authors of the paper stressed particularly the fact that no electric power or any other fuel is required in the operation of the proposed process.

Describing the process developed in the Columbia chemical engineering laboratories, the report explained that sulfur is burned in air to produce dry sulfur trioxide gas in the same way that sulfuric acid is made. "When this gas is thoroughly infiltrated through salt, a material is derived, which, when heated, produces salt cake and chlorine simultaneously," it continued.

The heat created by the burning sulfur or by the reaction of sulfur trioxide gas on salt is greater than the amount needed to produce the salt cake and chlorine. Commercial utilization of this process, according to the authors of the paper, will provide a cheap, abundant supply of these vital chemical products.

Normal, peace-time uses of chlorine have expanded tremendously with the development of plastics, synthetic materials, and organic chemicals, according to the report. "Now, with the preparedness program swinging into full stride, there seems to be no limit to the new demands that will be placed on this over-taxed industry," it said.

"In 1940, when chlorine production was close to capacity, 605,000 tons were consumed in the United States, an increase of 120,000 tons over 1939. This year the

demand is twice as great, and by 1942 it probably will double again.

"New uses for chlorine are found almost daily. Neoprene, principal ingredient of synthetic rubber contains chlorine. Ethylene glycol, used to cool the Army's latest high-speed airplanes, requires the chemical for its manufacture, as does ammonium picrate, the Navy's main source of explosives. Chlorine is also used to make the lucite windows of modern long-range bombers, and in the salt waterproof plastic insulations of anti-magnetic cables which have recently been designed to combat the menace of magnetic mines.

"Huge amounts of chlorine may be needed at any time to purify emergency supplies of water for armies in the field, as it now purifies the nation's water supplies. Chlorine compounds have uses varying from cleaning women's dresses to scouring the sides of battleships before painting; from manufacturing health restoring medicinals to preparing the latest types of war games."

Equally important, though less spectacular, is the demand for salt cake, the report said. "Hundreds of thousands of tons are used annually as raw material in the glass, paper and rayon industries," it pointed out. "In 1925, American factories consumed 243,500 tons of sodium sulfate, of which 3.6 per cent was imported. By 1936 industry's annual requirement rose to 466,000 tons, 37 per cent of which came from Germany. Four million dollars worth of salt cake was purchased in the United States in 1939.

"Manufacturers of paper pulp use about 75 per cent of this country's total consumption. The glass and heavy chemical industries each consume about 10 per cent, while the dye industry accounts for most of the remainder.

"When it was a by-product of the manufacture of nitric acid, salt cake was available in large quantities in this country. Even after the process of obtaining nitric acid from the air was perfected, large imports from Germany kept the price low.

"With the foreign source shut off, and defense requirements in this country rising rapidly, the demand for cheap salt cake has already exceeded the supply. It will be impossible to meet future needs for this important chemical without the utilization of new processes for its manufacture."

Among practical operating men closely connected with the industrial production of chlorine considerable skepticism was expressed concerning the feasibility of the process as outlined in the data presented.

Oxalic Acid from Sawdust

The fusion of caustic soda with sawdust to make salts of oxalic and acetic acids is, of course, not a new process. There were at least one or more plants built during and immediately after World War I to produce oxalic in this manner but the process was finally discarded. Work has been going on at the Polytechnic Institute of Brooklyn under the leadership of Prof. D. F. Othmer studying the fusion operation from the standpoint of more efficient recovery of the by products, as well as an attempt to increase the yield by more accurate control of the process variables.

According to Othmer and fellow-workers the method of continuous fusion of caustic and sawdust has been shown to be feasible and capable of industrial exploitation. Since the caustic is the most expensive raw material used, its efficient recovery is vital to the successful operation of the process. According to the authors of the paper methyl alcohol and formic acid are also produced in quantities large enough to warrant their separation and recovery.

In another paper presented Dr. Othmer and Raphael Katzen reported that waste wood, of which there are tremendous supplies available in this country, is being utilized in the production of a treated fiber called "lignocellulose" for use in plastics.

"A pilot plant is now in operation producing commercial quantities of lignocellulose molding compound for manufacture of plastic articles from wood flour or sawdust," according to the paper, which described continuous wood hydrolysis, a new process developed by the Northwood Chemical Company of Phelps, Wis.

"The continuous process results in lignocellulose residues of varying characteristics, dependent upon the specific use to which the material is to be put. Prime features of this new process are accuracy of control and simplicity of operation," the authors stated. Using the same chemical treatment as previous wood hydrolysis processes which have been developed here and abroad, the continuous process accomplishes, it is claimed, in one to ten minutes the chemical reaction which takes from 30 minutes to several hours by the older methods. Lignocellulose residues produced by the continuous process have plastic properties and at the same time retain much of the strength inherent in wood fibers. It has been found, however, that best results are obtained when lignocellulose is used as a semi-plastic filler in conjunction with resins now used in plastic molding compounds."

In addition, it is reported, chemical by-products are obtained from the process. Acetic acid, formic acid, furfural, and wood sugars can be recovered from the liquors remaining after processing of the waste wood.

The wood sugars may be converted in part into additional acetic and furfural, or may be fermented to ethyl alcohol, and acetone. For the greater part, these by-products may find use in the manufacture of other plastics or are suitable for use in chemical industry.

Small amounts of the lignocellulose molding compound are already in use in molding shops in the Mid-West and East according to Othmer and his co-workers. At present, they state, the new compound competes on a price basis with the most inexpensive plastics on the market and offers promise of considerably lower cost in the future.

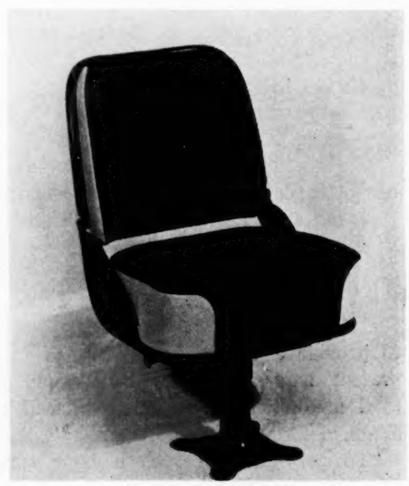
Properties of Vinylidene Chloride Plastics

In a paper delivered by W. C. Goggin and R. D. Lowry of Dow Chemical before a symposium on Progress in Higher Polymer Plastics the properties of polyvinylidene chloride plastics were outlined in detail. The Dow trade name is "Saran."

The development of vinylidene chloride by Dow began actively over ten years ago. As a direct result of research, it became possible to introduce the first vinylidene chloride polymers in a commercial way early in 1940.

Vinylidene chloride has petroleum and brine for its basic raw materials. It is clear, colorless liquid which can be readily polymerized to form valuable plastic material.

The outstanding general properties of Saran are such that they open broader fields for thermosplastic applications. Saran is extremely resistant to all acids and to all common alkalies except for concentrated ammonium hydroxide. It is substantially unaffected by both aliphatic

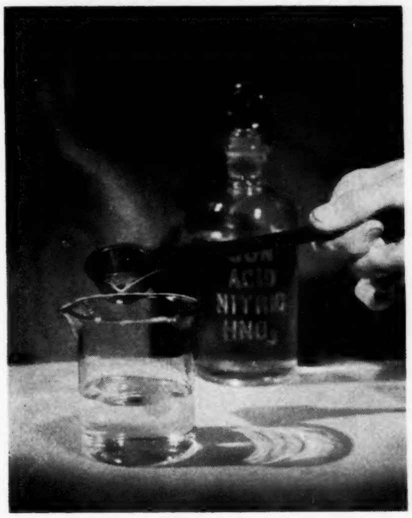


This new type of transportation seat, woven of Saran, is easily recleaned because it is impervious to action of soaps, drying cleaning fluids, acids and alkalies.

and aromatic hydrocarbons, alcohols, esters, ketones, and nitro paraffins. It is swelled or softened only by the uncommon oxygen bearing organic solvents such

as cyclohexanone, ethyl ether, and dioxane. Saran is outstanding among plastics in its low water absorption (A.S.T.M. tests, 0.00%) and the phenomenally low vapor transmission of its films (1-3 gms/sq.m/24 hrs.). It is thermoplastic and has a definite softening point which limits its practical operating temperature. However, exposures to higher temperatures are not dangerous from the standpoint of fire hazard since Saran is not flammable.

The basic polymers are odorless, tasteless, and nontoxic. Their high refractic index enhances their many color possibilities, while their toughness and abrasion resistance are of a high order, and the retention of these properties upon aging insures excellent wearing qualities.



Chemically inert, Saran has found wide application in the chemical industry where it may be used for dipping acids with this type of injection molded dipper.

Research shows that Saran's unusual property of crystallinity can be demonstrated readily by the use of X-ray diffraction patterns, or by viewing specimens through crossed polaroids. Most organic thermoplastics do not exhibit this crystallinity. It can be fabricated by conventional thermoplastic practice, and, due to its crystalline structure, it is susceptible to working by unique methods.

Through the use of modified screw type equipment, Saran can be extruded. The product, when first extruded and cooled, is soft, weak, and pliable. However, by heat-treatment, recrystallization, and the accompanying improvement in properties, can be produced and controlled. In this way, a wide range of properties can be obtained. Among its other qualities, research tests indicate Saran to have exceptionally good fatigue life. This is illustrated by the following example:

Specimens of Saran tubing, when fixed through a 15° arc 1750 times per minute, have withstood 2,500,000 cycles without rupture. In comparison, copper tubing failed after about 500 cycles in the same test.

A Few Applications

A few of the applications of extruded Saran which appear of interest include: rods for making gaskets, valve seats, ball checks; medicinal probes; chemically resistant, flexible tubing and pipe; tape for wrapping joints; chemical conveyor belts; tape and strips for die cutting; and various items of wearing apparel.

A second method of fabrication, that of crystallite orientation, brings out new, striking properties of Saran. The oriented form is produced by extrusion, subsequent plastic deformation, as by stretching, and heat-treatment. Research workers, studying the important part of the process, the stretching operation, have developed methods of control and technique which make possible continuous extrusions of monofilaments, tapes, and other shapes having the desired properties of high tensile strength, good flexibility, and exceptional fatigue life.

Extruded and oriented sections are now being produced for textile uses, ranging in size from .007 inches to .100 inches in circular monofilaments, and in other shapes having maximum dimensions up to .200 inches. These materials have shown adaptability to standard textile operations and have been fabricated by braiding, weaving, knitting, and twisting.

Saran monofilaments are being used advantageously and opportunely. Many uses of Saran fall in fields formerly supplied by imported natural products, such as hemp, long fiber paper, reed, rattan, horsehair, Spanish silkworm gut, and linen. From the results obtained, it appears that these substitutions will be permanent. A range of typical examples might include:

1. Filter fabrics.
Saran's extreme chemical resistance suits it for this use. Since it is a thermoplastic, the question of upper operating temperature limits immediately arises. Figure 15 shows that even at a temperature above that of boiling water, Saran still retains half its original tensile strength. Normal strength is regained on cooling to room temperatures.

2. Special ropes.
Saran's high wet strength and its chemical and fungal resistance have directed its use to special ropes and cores for wire ropes.

3. Articles of Apparel.
The general attractiveness and wide range of color possibilities fit Saran for such apparel accessories as belts, suspenders, handbags, and shoes.

4. Upholstery fabrics.
Long life, ease of cleaning, abrasion resistance, and flexibility, as well as color possibilities, have attracted upholstery fabric applications to Saran. Saran in subway transportation seating shows no material wear and appears like new after a hard service period of over a year. Saran upholstery fabric is now proving its merits in train and bus seats, as well as household furniture and automobile seat covers.
Injection molding offers an excellent fabrication method for Saran. This method makes possible the production of intricate shapes having properties similar to those obtained by extrusion as mentioned above.

Pictured above is an air brush injection handle molded of Saran, Dow Chemical Company's polyvinylidene chloride plastics described before a symposium at the ACS meeting.

Here again, Saran is playing its part in national defense. Many of its molding applications have been replacements of metals and not other thermoplastics. Comparative tests showed that, in most instances, Saran was the only material that would satisfy the industrial requirements for the replacement of such strategic materials as nickel, aluminum, stainless steel, and rubber in applications requiring chemical resistance.

A few examples of industrial applications are:

1. Spray-gun handles—chosen because of solvent and abrasion resistance—replacing aluminum. Here the practice of cleaning the equipment by washing in potent lacquer solvents does not affect Saran.

2. Valve seats—chosen because of freedom from channeling based on abrasion resistance, its perfect seating based on its resilience, and in some applications, its resistance to corrosive gases and liquors;—replacing expensive precision machined metal seats and imported horn seats. In one type of valve, Saran, far outperforming any previous metal seat, showed no air leakage after 15,000,000 cycles of operation.

3. Acid dipper—chosen because of acid resistance and toughness—replacing glass in hard usage where much breakage was encountered.

4. Moldings for the rayon industry such as spinnerette couplings, gasket holders, filter parts, nozzle tips, rollers, guides, etc.—chosen for its inertness and stability to chemicals and solvents used in processing rayon;—replacing special formulations of hard rubber.

In addition to the methods of fabrication so far discussed, there are many other operations which have been used in forming Saran, based on its combination of thermoplasticity and crystallinity. These operations include drawing, forging, blowing, rolling, stamping, and welding.

Catalytic Isomerization of Drying Oils and Fatty Acids

Common American-grown oils can be given drying qualities equal to oriental tung oil for use in paints by a new process described by T. F. Bradley and David

Richardson of the Stamford Research Laboratories of Cyanamid.

Processing of the oils is similar to making soap but the treatment is more severe and is continued longer than the usual soap-boiling, Bradley and Richardson explained. After boiling with alkali and water at high temperatures, the fatty acids of the oil, which have undergone a profound chemical change in the process, are separated from the soap by adding mineral acid.

The fatty acids can then be combined with glycerol to form improved oils for making paints and varnishes or used to form synthetic resins useful in modern quick-drying enamels. The fatty acids can also be distilled under high vacuum to yield even quicker drying fractions.

The present process, Bradley and Richardson explained, gives soybean and linseed oils drying qualities closely approaching those of imported tung oil. Since both oils are plentiful, the new process can cheaply convert them to more useful form.

The process is applicable, according to Bradley and Richardson, to cottonseed, corn and fish oils as well as to soybean and linseed. It can also be applied to dehydrated castor oil to improve its drying qualities.

Recombination of the treated fatty acids with glycerol or the related compound, penta-erythritol, should yield useful drying oils. As in the case of tung, oiticica and dehydrated castor oils, the glycerol and penta-erythritol esters of the treated fatty acids should thicken on heating (heat body) faster than the corresponding unconjugated unsaturation. Improved drying and higher resistance to moisture would be expected, as well as some tendency to frost, "gas-check" or wrinkle.

"Our investigations have confirmed most of these anticipated characteristics, yet have disclosed certain anomalies and previously unsuspected phenomena which we propose to describe in future communications," the chemists concluded.

"Because of current world conditions and the need for more adequate tung oil substitutes of domestic origin, it seems advisable to state that the process described has enabled us to develop such improved oils."

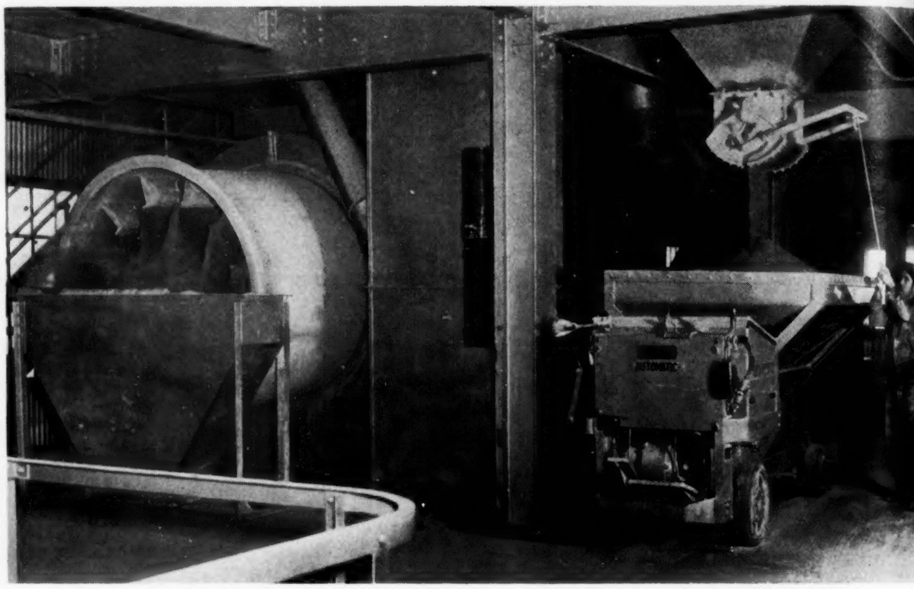
Cooling Ammoniated Fertilizers

In the field of improvement of equipment mechanical improvements in machinery for the cooling of ammoniated fertilizers were announced in a paper presented by E. F. Harford of Du Pont.

Mr. Harford reviewed the operations of rotary coolers now installed. He said that these have an annual capacity of 400,000 tons per season, cooling fertilizer to approximately 100° F. New units now being installed include louvers for distributing the air more uniformly over the cooler shell cross section, an improved inlet breeching and dust collector, and an automatic discharge valve.

"It has been noted in very cold weather," reported Mr. Harford, "that if the air-to-material ratio is not maintained at five cubic feet of air per pound of material or above, then the relative humidity of the exit air becomes so high that moisture condenses on the walls of air ducts and cyclone dust collector. Increasing the air volume lowers the relatively humidity and tends to prevent condensation."

The paper presented by Mr. Harford described a number of tests run on rotary drier-type apparatus for cooling ammoniated fertilizers. Results of such tests, he said, demonstrate that the stability of ammoniated mixtures is greatly increased by cooling and that, at low temperatures, the reversion reactions become so slow as to lose significance in normal storage periods.



Rotary cooler for ammoniated fertilizers. Fertilizer can be seen pouring from lifts in discharge end of the cooler shown at left. Cooled material discharges into elevator which carries it to floor above where it enters a loading hopper. Workman at right is drawing cooled material from loading hopper into buggy, on its way to storage pile. (Courtesy du Pont Company.)

A New All Glass Mill

In order that pigments, colors, inks, paints and industrial finishes may be produced batch after batch in uniform high quality, and to facilitate development of new materials and formulations, methods of routine testing must be provided which will duplicate as closely as possible conditions existing in large scale production. Such tests generally involve the dispersion of a pigment in a vehicle.

In current laboratory practice, such dispersions are prepared mainly by three methods—rubbing up with a hand muller, by means of proprietary automatic mullers, and by means of laboratory size roller mills. The first two tend to give poor dispersions when the pigment concerned does not meet high standards of "softness," while they all three, and especially the last, may yield contaminated products when the pigments concerned are white or light in color. This paper is concerned with a device which is largely free of these disadvantages.

A new mill has been designed, according to D. B. Pall of Interchemical Corp., N. Y. City, of which the important parts are an inner grinding section which is only slightly modified from an ordinary standard ground stopper, an outer conical grinding section which is essentially the outer part of an ordinary ground joint, and a neoprene tipped plunger fitting into the glass sleeve at the small end of the outer section, which serves as a syringe type feed mechanism. The ground stopper is slotted to provide for the proper feed of ink, etc., through the mill.

It is convenient to apply the feed and grinding force by means of pneumatic pistons. Pressure in the pistons is regulated by reducing valves connected to the laboratory air line, and controlled with references to gauges set in the piston lines. Power may be supplied adequate to the job by a geared down twentieth horse-power motor, the drive bearing of which is solidly fastened to one of the pneumatic pistons, so that the two have a common axis.

The motor is supported at a second point on a castor, and thus moved back and forth with the pneumatic piston. The motor drive shaft is fitted with a slotted head into which the stopper fits, and through which the rotary motion is imparted. In use, crudely mixed material is placed in the sleeve of the outer grind-

ing section, and the plunger and stopper inserted.

The sleeve is fastened down in a rubber lined clamp, in the axis of the two

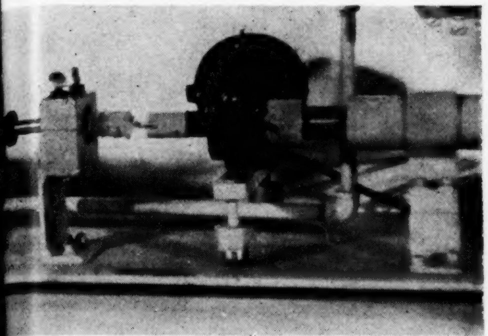


Photo taken by Interchemical Corp. of new all glass mill described at ACS meeting.

pistons and the motor drive shaft. Feed and grind pressure are then applied by adjusting the reducing valve, and the motor started. The material passes from the sleeve through the annular space in which it is thoroughly ground, and is collected at the opposite end of the assembly.

The performance of this mill has been matched against that obtainable with a roller mill, and with hand mulling. A 40-inch by 8 inch three roller mill was used, while both weighted and unweighted mullers were tried. The following conclusions were drawn from the results obtained:

a) In contrast with other methods, the mill yields dispersed products free from contamination.
b) The mill yields mixtures which are considerably better dispersed than those obtainable by hand mulling, and almost as well dispersed as those obtainable with the three roller mill.

Among other advantages of the new mill, the following may be listed:

a) The glass parts have a long life, and may be replaced at low cost.
b) The amount of sample required is of the order of one gram, often an advantage when one is concerned with pigment research, wherein many instances only a small amount of test pigment is available.

The Professional Training of Chemists

In a paper entitled "Industry's Interest in the Professional Training of Chemists," Dr. William Cabler Moore of the Research Staff of U. S. Industrial Chemicals, Inc., pointed out in a symposium on "Professional Training of Chemists and Chemical Engineers" that the great variety of industrial activity in this country requires the services of thousands of chemists in research, development and control work, the latter including, of course, scientific "trouble shooting."

Since each commercial organization has problems which are unique to its activities it is neither possible nor desirable for educational institutions of the higher type to train men for particular industries or groups of industries, but industry as a whole does expect men college and university graduates they hire to be trained in fundamentals.

Reviewing some typical problems encountered in an industrial research laboratory, Dr. Moore stated that all of those problems had either been solved, or were being solved by making measurements on energy and on matter. The seeming paradox that highly trained chemists in industrial laboratories generally teach methods of measurement to their assistants who most likely have completed high school work only, is resolved when we look a little further into this matter; for then we learn that the colleges and universities are expected to furnish to the industries men who are capable, not only of making measurements, but also of planning the work on which measurements are made; developing new methods of measurement where necessary; interpreting these measurements; and finally, applying those measurements to the solution of industry's problems so that a profit will result.

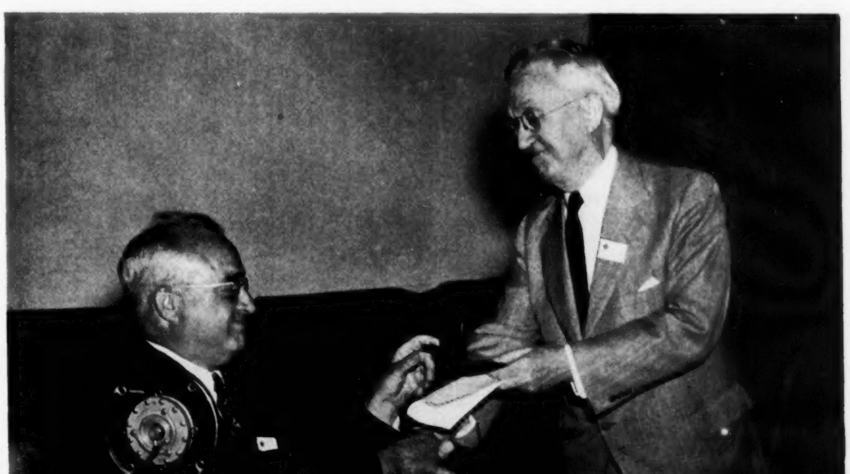
Formal courses for a prospective member of the staff of industrial laboratory should include not only the time tested methods of chemical analysis but instruction in the use of the newer instruments developed in recent years. Moreover, concurrent courses in physics and mathematics are essential to the well trained chemist of today.

While the physical equipment for such extensive courses may be available in only a few educational institutions, every college and university in the country can do much toward furnishing their graduates with better equipment if instructors in chemistry insist upon each student writing full, complete, accurate and dated notes of all of his experimental work as soon as performed.

Since all industrial progress is the result of group activity, and is not due to the single handed work of any one man, universities in particular should give more attention to group research in training men for industrial positions. This should develop an appreciation of the value of cooperation in solving problems, and ought to enable the man entering industrial scientific work for the first time to orient himself more quickly in his job than would otherwise be the case. However, the greatest asset a research man can possess is an abundance of ideas; for it is only from individual ideas that group efforts can develop.

To secure the best results universities should carefully select students for graduate work limiting their choices to those whose records show that they possess not only real ability but also a high degree of intellectual honesty. A chemical "yes man" may easily become a great liability to the company employing him but the industrial scientist should always exercise his independence of thought and action so that he wins the support and not the antagonism of his colleagues who have to manufacture his company's products.

Dr. Moore concluded his paper by a plea to those in charge of training chemical engineers to put less emphasis on "unit processes" and on the chemical engineer's opportunities to become a plant executive who will have to produce things at a profit, and more emphasis on training these men to realize that each industry has problems peculiar to itself which can be approached only from the experimental point of view, and that no one, not even a chemical engineer, knows all the answers to all the problems without plenty of hard gruelling work.



Above, Professor William Lloyd Evans, Ohio State University, president of the American Chemical Society (right), presents the Priestley Medal, highest honor bestowed by the society, to Dr. Thomas Midgley, vice-president of the Ethyl Gasoline Corp. for outstanding achievement in chemical science.

New Products and Processes

By James M. Crowe, *Assistant Editor*

A NOVEL high temperature saponification method for making soap was described before the American Chemical Society at Atlantic City, by Joseph J. Jacobs of Polytechnic Institute of Brooklyn.

Usually soap is made by the action of a water solution of lye on fats or tallow which takes considerable time. The new process eliminates the use of water. The fat is dissolved in kerosene and solid lye is added. The mixture is then heated to a high temperature where because of the high concentration and temperature of the fats and lye a rapid reaction takes place. The hot mass of soap and kerosene is then sprayed into a vacuum chamber where the kerosene and glycerine, which is always formed in the manufacture of soap, vaporize off, leaving a dry granular soap behind. The kerosene and glycerine are condensed and separated. The kerosene can be reused for a new batch. A characteristic of the process is that the glycerine is recovered as a water free product, in contrast to the water mixture of the usual soap making process. Except for slight traces the kerosene does not appear in the soap or glycerine.

It is reported that heat costs, outside of the saving in time and labor, are about one-twentieth those of present methods.

Metal Cleaner

A new metal cleaning composition for removing buffing compounds, grease and similar foreign matter from metals is now being offered by the Quaker Chemical Products Corp. under the brand name, "Quasol #11."

This product is compatible with most mineral solvents to form a clear liquid of extreme penetrating and emulsifying properties. A mixture of 1 part Quasol #11 and 7 to 12 parts of kerosene or similar solvent is employed. Because of the fact that this product can be diluted with such large quantities of solvent and still be rinsed off with water, it is a far more economical procedure than the usual products employed which are only diluted one part to five parts of water.

Quasol #11-solvent mixture is applied in a spray washing machine or tank. The work to be cleaned is subjected to the solution for from 1 to 3 minutes, depending on the strength of the solution, after which it is rinsed and ready for the electro-cleaning process before plating or other finishing operations.

Quasol #11 is rapid and thorough in its action and it cannot tarnish highly oxidizable metals. Another big advantage is that it eliminates the necessity of scrubbing and hand-wiping.

Motor Fuel from Farm Crops

A semi-commercial plant for production of motor fuel from farm products has been practically completed at the U. S. Department of Agriculture's Northern Regional Research Laboratory at Peoria, Ill. This so-called pilot plant, into which the chemists and engineers have incorporated the latest improvements in equipment and processes available, is to be used for large-scale testing of promising developments from the Regional Laboratory and elsewhere, and is capable of producing 500 gallons of alcohol per day.

"Because of the important role of motor fuel in industry and the daily lives of the people in this country," says Dr. Henry G. Knight, Chief of the Bureau of Agricultural Chemistry and Engineering, "we are making every effort to push this important research. The United States is particularly fortunate in its supplies of fuels for all purposes, but improvements and development of special fuels would be welcome, particularly these days when defense requirements call for the best we can do. Laboratory research, turned in this direction during the past, is being intensified to keep pace with defense requirements and to develop economical motor fuels from farm crops and wastes. Now we have the new pilot plant so necessary as a check on the test-tube findings."

The Northern Laboratory in addition to the study of ways of manufacture of these special motor fuels will also study performance of the fuels in engines. The usual laboratory work will be continued in an effort to develop new fundamental facts in the production and use of alcohol and other materials with motor fuel possibilities.

At Peoria the first pilot plant work will be on corn, followed by work on sweet-potatoes, white potatoes, wheat and other carbohydrate crops.

High-Temperature Packing

A new asbestos packing for elevated temperatures has been added to the well-known "Palmetto" line of packing by Greene, Tweed & Co.

This packing, known as Palmetto Cab Cock Packing, is braided from long-fibre Canadian asbestos yarn. Each strand is individually coated with dry graphite to retard fusion of asbestos and to provide an anti-friction wearing surface. The packing contains no liquid lubricant which might be boiled away.

Palmetto Cab Cock Packing is intended for pumps and valves handling high-temperature steam, oils, and gases, and also for expansion joints, furnace door grooves, locomotive cab cocks, and many applications in petroleum refineries.

Durez 775

A new general-purpose phenolic molding compound is announced by Durez Plastics & Chemicals, Inc., Walck Road, North Tonawanda, N. Y. This material is to be known as Durez 775 Black.

It was developed to make available a material which would have a wider range of application than existing general-purpose materials. Among the improvements over present compounds of this type are listed: lower water absorption, slightly higher flexural and tensile strength, heat resistance of 400° F. It is also stated that Durez 775 Black has excellent molding characteristics, fast cure, and will deliver a smoother, more lustrous finish than the average general-purpose material.

Protective Glove

The glove pictured here was developed by the Resistoflex Corporation to prevent oils and solvents from coming in contact with the skin. They have been used to control occupational diseases such as folliculitis and dermatilis as well as more serious toxicity affecting the blood and other organs.

Resistoflex PVA, from which the gloves are made, is a rubber-like substance that is chemically unaffected by nearly all organic solvents. Because of this property immunity is gained by workers handling such materials as petroleum or naphtha solvents, carbon tetrachloride, trichlorethylene, perchlorethylene, benzol, ether, chloroform, ethylene dichloride and sulfur-base cutting oils.

PERSONALITIES IN CHEMISTRY

(*Continued from page 447*)

he found cholera raging in every village, and though he was obliged to remain in that region all winter, he "enjoyed a most interesting social life."

In 1910 the U. S. Department of Commerce planned a survey of the chemical industries of foreign countries. Norton, because of his experience and training, was borrowed from the State Department for the assignment. Much of his findings were published as "The Chemical Industries of Belgium, Holland, Norway, and Sweden," and "The Utilization of Atmospheric Nitrogen." The latter paper has been a potent factor in the development in America of the nitrogen fixation business.

Information On Dyes

It will be recalled that at the outbreak of World War I in 1914, great anxiety prevailed in this country because of our inability to secure immediately many chemicals formerly obtained from abroad. We were dependent upon Germany for dyes especially. The United States Senate passed a resolution calling on the Secretary of Commerce "to inform the Senate . . . as to the facts relating to the supply of dyestuffs for American textile and other industries." Wisely, Norton was chosen for this task, and the results of his work were presented as the "Dyestuff Census." This census listed all the dyes imported from Germany in 1914, giving quantities used, chemical compositions of each and references to directions for making same. The report has been called the "New Testament" of the dye industry. In addition to furnishing the all-essential statistical basis for intelligently and economically creating an American dye industry, this census exposed many of the practices and deceptions followed by Germany to control the dye market and prevent entrance of American rivals.

Though Norton's report focused attention upon the subject, in the absence of legislation to safeguard the proposed American dye industry, our capital was reluctant to enter upon it. It was necessary to conduct a campaign of education, and in this Norton took a most active part, both by voice and by pen. In the end, the essence of Norton's proposals were recommended to Congress by President Wilson and enacted into law.

Becomes Editor

At the time the dye situation was cleared, Norton was in his late sixties. His feet no longer itched for travel. He was disposed to forego the rigors of further foreign service. Accordingly he withdrew from government service to become editor of the "Chemical Engineer" and a consultant. His services were immediately acquired by the DuPont Company, which company was preparing to go into the production of dyestuffs upon a large scale. He remained at Wilmington until 1920 when he returned to journalism as editor of "Chemicals" and co-editor of the "Chemical, Color and Oil Daily."

And a final time when in his eighties, Norton was drawn from journalism to the chemical plant—this time by the American Cyanamid Company. At present he is actively engaged in translating and searching the scientific literature for the company's Stamford (Conn.) Research Laboratories. Now in his ninetieth year, he amazes all who know him. Time has dimmed only his hearing. His eyes and wit are still keen; his hand firm.

On his 90th birthday, Mr. William B. Bell, president of The American Cyanamid Company sent greetings and good wishes to Norton on behalf of his associates and co-workers. "To have witnessed, as you have done, the phenominal growth of chemical science and industry in America over the decades and to have been an important contributor to it is a privilege few of us may expect to enjoy." But as much as chemists have contributed to the economic and scientific evolution of our country, Norton is of the opinion that we have done little more than set the stage for the spectacles to come.

Recipient of Honors

Though the recipient of numerous honors, Norton probably regards none of them more highly than being awarded the Lavoisier Medal of the French Chemical Society. He is one of the very few American Chemists thus honored.

In 1883 Norton married Edith Eliza Ames, of Lockport, N. Y. She was distinguished as an author and lecturer. Her book "Rugs in Their Native Land" is an authority on both sides of the Atlantic. She died in 1929. Their only child, Robert Ames Norton, is Patent Counsel for The American Cyanamid Company.

Interest In Chess

Chess and genealogy have been Norton's life-long hobbies. At college he was chess champion. He founded the Mount Auburn Club at Cincinnati, and the Brandywine Club, at Wilmington. He has played chess all over the world; two days with the monks of the Benedictine monastery of Monte Cassino, Italy; games on horseback while riding through Mesopotamia; games while floating down the Tigris; at Nineveh; with the envoy of the Shah of Persia; encounters with the champion lady player of New York City, with the American champion, and "a charming defeat" by the world's champion.

Although most mortals have plenty of trouble with chess as ordinarily played, Norton devised a four-man game of chess to be played on a board made into a Maltese cross by adding two rows of eight squares each to each side of the usual square board of sixty-four squares. When introduced at the Chemists' Club in N. Y. the game proved too intricate and exhausting for the members. Another arrangement for two chessmen, employing eighteen men each on a board of 81 squares met the same fate.

Interested in Genealogy

His flair for genealogy is almost equal to that for chess. The doctor has enjoyed collecting and collating, thus far, information concerning 6,390 of his direct ancestors. He has aided many of his friends to likewise link their names to their ancestors.

WASHINGTON

By T. N. Sandifer

(*Continued from page 435*)

and who wish to reproduce this form for such use may do so. However, they must follow exactly the phraseology, size, format, and color of the official blanks furnished by the Priorities Division.

Some explanation of the recent order of OPA placing a ceiling price on bulk sales of acetic acid may be pertinent, which became effective September 29. In the face of a substantially increased demand for this article, and a feeling on the part of Price Administration officials that the price should not reasonably exceed third quarter levels the ceiling was set, but by limiting its application to sales of 3,000 pounds or more, it is believed will affect only very large jobbers or manufacturers of acetic acid.

It is not expected that prices for smaller lots sold by jobbers and dealers will reflect more than the normal margins or mark-ups, but if conditions later warrant, it is planned to amend the schedule to cover smaller transactions Schedules fixing top prices on other industrial solvents, including wood alcohols, also are in preparation and may be promulgated by the time this appears.

In reference to the recent action of OPM in turning over to the Department of Justice certain complaints of monopoly practices and extortionate prices in chemicals, with the warning that the legal agency may take action after studying the matter, it should be stated that OPM issued nothing official on the affair. It was intimated here that most of the concerns under study were comparative newcomers in the industry, and even perhaps classifiable as "outsiders."

CHEMICAL SPECIALTIES

Royal Dry Cleaner is manufactured by Hecker Products Corporation, Indianapolis. It comes in the tin can pictured here or in a $1\frac{3}{4}$ oz. bottle. Non-explosive and non-inflammable, it is claimed to clean perfectly all fine fabrics—quickly, easily and efficiently—and what is best, it leaves no odor.

INDUSTRIAL · HOUSEHOLD · AGRICULTURAL

METAL

Metal polish, still holding its own as a chemical specialty, usually means brass polish. So-called chromium polishes really are chromium cleaners for the simple reason that chromium does not tarnish. Here's the story on both polishes and cleaners—liquid, powder or paste, for your own enlightenment

By C. T. Small, Ph.D.

METAL polish, which inferentially means brass polish, still occupies a respectable place as a chemical specialty, although sales volume is doubtless much smaller than before the adoption of lacquered aluminum as an architectural trim, chromium plate as an automobile trim and for household appliances. While brass polish is still the important metal polish, a number of products are offered for the maintenance of chromium plate. However, it is well recognized by the trade that these are chromium *cleaners* rather than polishes. Why? Because chromium does not tarnish. This means that it does not react with moisture and other ingredients in the atmosphere to form chromium compounds. This non-reactivity accounts largely for the special virtues of chromium as a plating material.

Chromium Cleaners

Metal collects soil, even though its surface is relatively very smooth, so that in most cases it must be both cleaned and polished. If a metal is nontarnishing, ordinary washing should keep it clean; this applies particularly to chromium plate on household utensils. Chromium trim on automobiles collects much heavier soil, usually a certain amount of grease, road film, and solid soil embedded in this. It is more particularly for this kind of soil removal that special chromium cleaners have been designed. A commercial product retailing for 50 cents for a 16 ounce can has the approximate composition:

Silica abrasive	25 %
Ammonium oleate soap	2
Light mineral oil	14
Ammonium oxalate	3
Excess ammonia	0.5
Pine oil	2
Water	53.5

In this product the abrasive is not present as a polishing agent as would be the case with true metal polishes—a fact which will be explained presently—it serves as a cleaner to remove solid soil by friction, just as scouring powders are scrubbed over a tiled bathroom floor to take off the dirt. The soap is an emulsifying agent to emulsify oil and water and also to help maintain the silica in suspension. Many of these cleaners contain free oil, the purpose of this being to leave a very light film of oil on the surface of the chromium to give it color depth and a brighter appearance. Ammonium oxalate is often present in true metal polishes, as it has a dissolving action on certain metallic compounds. Since chromium does not form such compounds under the conditions of which we are speaking, no good reason exists for the inclusion of ammonium oxalate in this product. Free ammonia always has some cleaning action on a smooth surface such as that of metal or of glass. Possibly it reacts with free fatty acids in the fatty matter present in the soil, forming soap and promoting cleaning in this way. Pine oil serves as an odorant.

A somewhat different product, selling for 29 cents for a half pint can, contains approximately the following:

Silica abrasive	6 %
Triethanolamine oleate	3
Bentonite	0.5
Orthodichlorobenzene	10
Excess oleic acid	0.5
Water	80

The abrasive content in this is low, but is probably sufficient to have some scouring action. The oleate soap serves as emulsifying and suspending agent, and is assisted in these functions by bentonite. This is a colloidal clay which has suspending power because of its high capacity for surface adsorption. It also thickens the emulsion because of its colloidal character. Such thickening is not usually con-

sidered desirable as more work is required to give the polishing effect. Orthodichlorobenzene was believed at one time to clean metallic surfaces by dissolving the oxides present, but it is now considered of little value in this respect. Oleic acid is probably present to leave a luster on the metal.

A soft paste cleaner differs from the foregoing in containing a mixture of two kinds of emulsifying agents, as well as two types of abrasives.

Mixture of silica and pumice	55 %
Ammonium stearate	0.5
Water-soluble gum	0.2
Sodium silicate	0.5
Water	43.8

POLISH

Both soap and an organic emulsifier of the nature of gum tragacanth are present. Sodium silicate increases the alkalinity of the product, promoting cleansing action, also it is somewhat colloidal in nature. Because of the inclusion of the hard abrasive, pumice, the label on this product warns against its use on household articles, particularly on silver.

Brass Polish

The most significant ingredient in a brass polish is the abrasive, which brings us to a consideration of what types of materials are used for abrasive purposes and what their polishing effect is in relation to the particular metallic surfaces to which they are to be applied. Pure metals vary widely in hardness, as shown by the following table, in which the arbitrary figure of 10 represents maximum hardness on Moh's scale.

Chromium	9
Nickel	4+
Brass	3+
Bronze	3+
Copper	3
Aluminum	3—
Gold	3—
Silver	2

Pure gold and silver are so soft that they are alloyed with varying amounts of copper to make them hard enough to be useful. Chromium is very hard, a property which is not related to its nontarnishing character, since gold also is nontarnishing.

In order to obtain a high polish on a metal, an abrasive is required whose hardness is properly related to that of the particular metal. The polishing agent must scratch the surface lightly, so lightly that the scratches are not visible except under the microscope, when they show up as parallel striations. Among the common hard abrasives are quartz silica with a rating of 7 on Moh's scale of hardness, feldspar with a rating of 6-6.5, and pumice with a rating of about 6. A much harder abrasive than these has to be used for the factory polishing of chromium, giving it a permanent luster. Abrasives like quartz and pumice are much too hard for use in brass polish, as they would scratch it deeply, leaving visible mars.

Brass polish is also commonly used on nickel, bronze and copper, although nickel is enough harder than brass so that the same polish would be less efficient. Too soft an abrasive simply slides over the surface without affecting it. Brass and bronze are both based on copper, the former being an alloy with zinc, the latter an alloy with tin. Copper is prone to form oxides and other compounds in a moist atmosphere, the colored corrosion products being dark and unsightly. Frequently an ingredient is present which brings about chemical cleaning by reaction with compounds forming the tarnish, an added effect to the mechanical cleaning and polishing of the abrasive. Such a cleaning agent increases the efficiency of the product and makes it quicker acting. Some of the U. S. Government specifications require chemical cleaning in metal polish.

The most common abrasive used is amorphous silica, which is quite different from quartz silica and much softer, so that it polishes rather than scratches a brass surface. Too soft an abrasive such as diatomaceous earth, used commonly in silver polish, would clean brass but would not be sufficiently hard to polish it.

The most common chemical cleaner in brass polish is ammonia or an ammonium compound, usually ammonium oxalate. Ammonia reacts with various compounds of copper to form soluble cuprammonium compounds having a complex positive ion. This explains the dissolving action of ammonia on the corrosion film on copper, brass or bronze, easily demonstrated by pouring a little ammonia on an old penny, then rinsing it in water after a moment or two. Oxalates also possess some cleaning action.

Liquids

A popular form of brass polish is an aqueous suspension—usually termed an emulsion because it may look more like a mixture of two liquids than like a suspension of solid particles in a liquid medium. This suspension or "emulsion" is easy to rub on, easy to work up, and economical because it can be spread out in a thin layer. An example of a successful commercial product in the form of a somewhat thick white liquid which retails at 40 cents for a pint can, is the following:

Silica	25%
Sodium oleate soap	5
Sodium oxalate	1
Pine oil	4
Water	65

The amount of soap present has sufficient suspending power to keep the silica from settling out. Sodium oxalate has a chemical effect, and pine oil serves as odorant. Earlier types of metal polish were based on a suspension of abrasive in petroleum naphtha—the latter being a grease solvent would help dissolve away part of the soil, since all soil is apt to contain some fatty or greasy matter. The serious drawback of such a polish is its inflammability, which places limitations on its sale and storage. Because of this, such formulations have for the most part been abandoned.

A similar product is another aqueous emulsion having the approximate formula:

Silica	35 %
Stearic acid	1.5
Ammonia, 26°Be.	7
Oxalic acid	6
Alcohol	1.5
Water	49

The soap in most of these products is usually formed during manufacture by the reaction of the melted fatty acid and the alkali, in this case, ammonia. In the above formula, about 1 per cent. of ammonia is present in excess, the rest combining to form ammonium stearate soap and ammonium oxalate. The alcohol makes the liquid somewhat more fluid, increasing the ease with which it can be spread over the metal before polishing.

The above ingredients appear in many of the polishes of today, the proportions varying somewhat, as in the following:

Silica	13 %
Ammonia soap	3.5
Ammonium oxalate	0.5
Free ammonia, 26°Be.	3.5
Pine oil	1
Alcohol	3.5
Water	75
Silica	20
Ammonium oleate	6
Ammonium oxalate	4
Free Ammonia, 26°Be.	0.5
Alcohol	2.5
Water	67

The silica used in the thin emulsions is ordinarily 325-mesh, but may be somewhat coarser in thick suspensions.

Powders

A number of powdered metal polishes are on the market. Some of these resemble the emulsions in composition except that they are in dry form—while some are quite different. An example of the former is the following:

Silica	55%
Diatomaceous earth	15
Precipitated chalk	13
Tallow soap	16
Ammonium oxalate	2

Oddly enough, here is a mixture of three abrasive materials. The diatomaceous earth and precipitated chalk are both soft abrasives and can only be considered as inert diluents for the silica in polishing brass. This is probably far from the intention of the manufacturer, since these two abrasive materials are much more expensive than amorphous silica. They may have been included with the idea of improving the product, but actually they fail to do this.

A powder containing soap, like the above, can be mixed with water by the user to give an emulsion form of polish, although hand mixing can not be expected to give as stable a suspension as can be obtained by mechanical mixing by the manufacturer. More commonly the powder is simply rubbed on with a damp cloth, a more concentrated form of active ingredients thus being applied than when an emulsion is used.

Another powdered metal polish has more the composition of a general household cleaning agent, and may have been intended to serve both as a metal polish and a general scouring powder.

Silica, 150 mesh	73%
Soda soap	9
Soda ash	14
Moisture	4

The silica is coarser than that commonly used in brass polish. Soda ash is nearly always present in general household cleansers because it is an active soap builder increasing alkalinity, and is low in cost.

An even simpler formula is the following:

Silica	91%
Oxalic acid	9

This product is advertised not only to polish metals, but to dissolve rust from chrome and nickel. Both claims are well justified inasmuch as the silica will do the polishing, while oxalic acid solution removes rust spots. Enough water has to be applied with the polish to give the acid a chance to dissolve. Nickel plate has the well-known defect of developing tiny pinholes through which moisture gains access to the iron beneath. As iron rust is formed it creeps up and spreads around the hole in the nickel plate. There is often good reason for cleaning old nickel-plated pieces with oxalic acid. If less than 10 per cent. of the acid is present, the poison label need not be carried on the product; 10 per cent. or more requires this in accordance with the Caustic Poison Act.

Very similar to the above is a product containing 83 per cent. of pumice and 17 of oxalic acid. While this is recommended on the label for cleaning copper and brass, it is too harsh a product for that. At least when Italian pumice was imported, this was a hard abrasive. Whether the domestic pumice now on the market is of the same degree of hardness would have to be determined by physical tests. In general, it would seem that this product is more suited for use on Monel metal, stainless steel and some of the harder materials of that sort. These powders usually make the point that they are highly concentrated products, one pound being equivalent to a gallon of liquid polish. Some of them are obviously aimed at bar- and soda-fountain business, and are sold in one-pound containers only. The pumice-containing product retails for 60 cents a pound.

Powdered Polishes

Two powdered polishes are quite different from any of the preceding, but resemble one another so nearly that the one appearing later was no doubt intended to duplicate the first.

Petrolatum	27%
Stearic acid	7
Dolomitic lime	66
Petrolatum	19%
Stearic acid	3
Dolomitic limestone	78

Both of these contain a trace of iron oxide pigment—enough in one case to give the powder a pink color. The first formula contains enough petrolatum to cake the powder together. The petrolatum and stearic acid rubbed over the metal leave a light film said to give a "brilliant lasting luster." Dolomitic lime and limestone are rather soft abrasives. Such a product would require a good deal of rubbing, and would not give a satisfactory sheen unless the metal was rubbed until it appeared completely dry. The demand for such a product would seem to be rather restricted.

While both liquid and powdered metal polishes continue to be sold, the liquids are in general packaged and labeled in a way to attract the housewife, the powders for a more commercial form of consumption. It might be possible to appeal to both fields with the same product—in one case, by the more elaborate procedure of forming a reasonably permanent aqueous suspension, in the other case by mixing and packaging the same ingredients in the dry state.

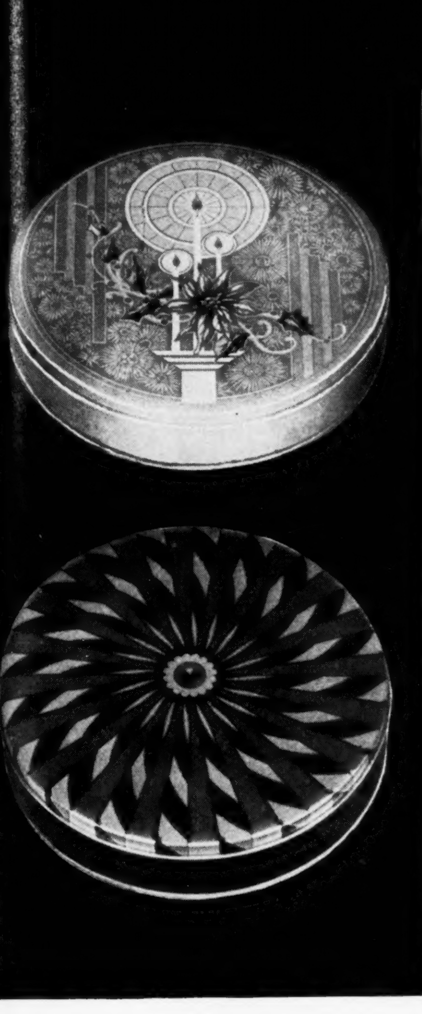
Industry's Bookshelf

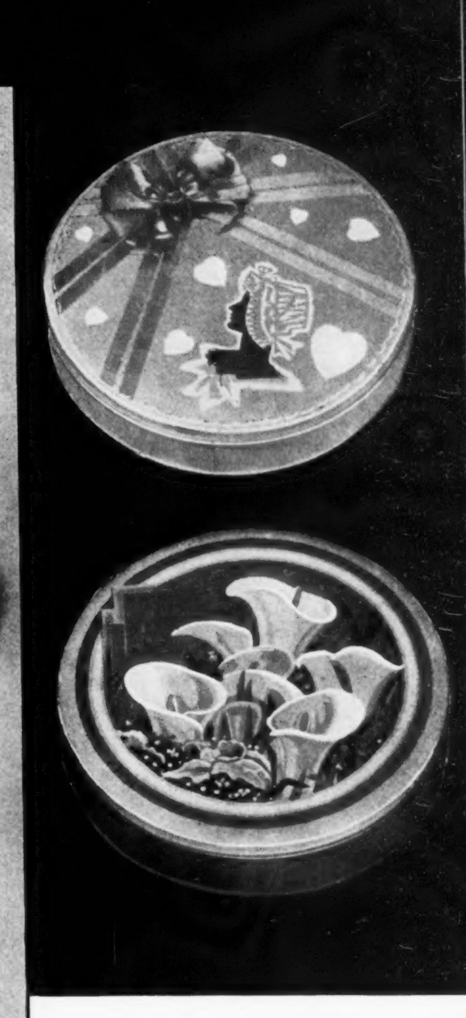
Handbook of Chemistry, Fourth Edition, Edited by Norbert A. Lange, Handbook Publishers, Inc., Sandusky, Ohio, 1,935 pages, $6.00. The newest edition of this handbook expands its service as one of the handiest references for chemists, physicists and engineers. Additions and changes have been made in the standing matter to keep the work up to the present with new or improved data that became available during the past year. All of the tables in the previous editions have been retained with the exception of "Wave Length of the Principal Lines in the Emission Spectra of the Elements," which has been replaced with two tables, "Qualitative Spectrographic Analysis" and "Sensitive Lines of the Elements." Eleven entirely new tables have been added. They are Synthetic Rubbers (gives varieties and manufactures with chemical, physical and electrical properties), Correction of the Boiling Point for Pressure, Calculation of the Boiling Point of Organic Compounds, Qualitative Spectrographic Analysis, Sensitive line of the elements, Hammonds' Cuprous oxide and Copper Equivalents of Sugars, Conversion of Specific Gravity to Density, Azeotropic Mixtures, Tank and Pipe Capacities, Logarithms of Factorial n, and Binomial Coefficients.

A valuable part of this handbook is the 270 page appendix of mathematerial tables and formulas compiled by R. S. Burington of Case School of Applied Science. The treatment is complete enough that it might be used as a textbook and comprehensive enough for either the occassional or frequent user of mathematics.

The New Encyclopedia of Machine Shop Practice, Edited by George W. Barnwell, Wm. H. Wise & Co., Inc., New York, 568 pages, $1.98. This book compiled and edited by Professor George W. Barnwell of Stevens Institute of Technology and a score of experts should be of considerable value. It is a thoroughly up-to-the-minute guide to the principles and practice of machine shop procedure. The text, simple and concise, covers 2800 items from the operation of hand filing to the explanation of large machine tools. An interesting section of the book is the discussion of powder metallurgy included in the extensive chapter on metallurgy.

Illustrations and diagrams make the work and explanations easy to visualize.





Exquisite Sardonyx Pendant from the 15th century now in the Metropolitan Museum of Art of New York City.

COMBINING ARTISTRY AND CRAFTSMANSHIP TO MAKE METAL PACKAGES MORE BEAUTIFUL

TODAY art and design . . . creative genius and merchandising experts . . . combine their talents to design modern packages. Heekin Colorful Lithography on Metal furnishes thousands of businesses with the kind of lithographed cans that sell merchandise . . . some distinctively beautiful to appeal to the women . . . some masculine in their severity to appeal to the men . . . designed for the product as well as the market. Heekin Superior Lithography on Metal is no more costly than the usual lithographed can. Yet, into every single can . . . in all shapes and sizes . . . goes that extra color brilliance . . . that longer lasting luster . . . that special beauty that makes Heekin Lithographed Cans the choice of men and women whose problem is Sales.

THE HEEKIN CAN CO., CINCINNATI, OHIO

CHEMICAL SPECIALTY News!

Ninth Annual Convention of National Pest Control Association, Inc., Scheduled for St. Francis Hotel, San Francisco, Oct. 27, 28, 29. —NOPCO Launches Second Bowling Season—New Ply Distributors—National Aniline Producing Detergents—New Firm

NINTH annual convention of the National Pest Control Association, Inc., is scheduled for the St. Francis Hotel, San Francisco, Oct. 27, 28, 29. An intensive program has been arranged and the association expects a record attendance of persons directly or indirectly concerned with household and structural pest control service work.

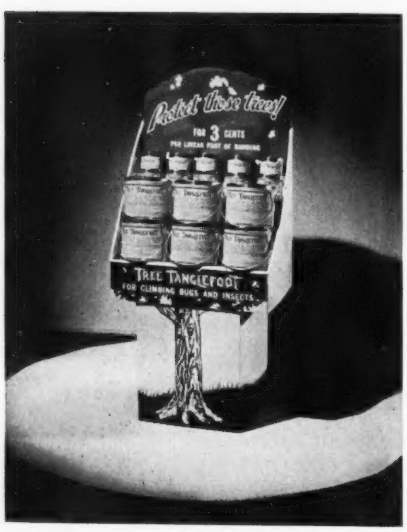
W. O. Buettner, NPCA, Inc., 3019 Ft. Hamilton Pkway, Bklyn, N. Y., is making reservations. Among the highlights scheduled for the convention are:

"Bureau of Entomology and Plant Quarantine Co-operates with the PCO"—Dr. P. N. Annand, Chief of Bureau or Avery S. Hoyt, Associate Chief. "Keeping Up with the Changing Pest Control Industry"—Prof. J. J. Davis. "Common Household Insects and Pests"—Prof. J. J. Davis, Chairman; Al Forde, Robert E. Hackley, E. E. Horn, Arnold Mallis, Harold Haecker. PCO's will be called upon to relate interesting experiences. "New Developments in Rat Control"—Ernest M. Mills. "Legislation"—William O. Buettner, Chairman; Max J. Levy, Wayne K. Davis. "The Workings of California Law Regarding Insecticides and Other Economic Poisons"—Dr. Alvin Cox. "Wage and Hour Law"—H. K. Steckel. "California Structural Pest Control Law"—William Hogan.

"Termites, Woodboring Insects and Fungi"—F. K. Harder, Chairman; W. J. Burgin, J. R. Franklin, Ernest R. Barber, Ernest Forde, J. E. McNatt, Harry Tanner. "Termite Control Brought Up to Date"—Dr. Thos. E. Snyder. "Testing Chemicals on Actual Jobs"—W. E. McCauley. "National Defense in Relation to Pest Control"—George A. Rader, Chairman.

"Public Relations"—Ernest G. Mills, Chairman; Lee Williams, Morton Prescott, Louis Gatto, Lee Christensen. "Public Health and Pests"—Dr. J. C. Geiger. "We Sell Pest Control Service"—Three Sales' Demonstrations by California PCO's "Termite," "Restaurant" and "Apartment" jobs.—George A. Rader, O. W. Dickens, Wayne Davis, Elmer A. Roberts, Charles J. Menard, Al Forde. "Research"—P. Calvert Cissel, Chairman; William O. Buettner, Peter Ting, Wallace Tanner, D. B. Mackie.

"Products and Supplies"—Martin T. Meyer, Chairman; E. F. Sennewald. "United Attitude Needed"—Esler Johnson. "Safti-Fume"—Charles W. Houghton. "Disinfectants"—Speaker to be announced. "Special Comments"—Representatives of Manufacturers and Supply Houses who are in attendance are invited to make statements of interest. "Fumigants and Unusual Insects and Problems"—F. E. Bohman, Chairman; J. J. Davis, Mrs. Wilbur F. Smith, Robert Loibl, Sr., S. S. Heaton. "Insulation"—Harold R. Hay.



Tanglefoot Co., Grand Rapids, Mich., markets Tree Tanglefoot in this compact corrugated "Sólmor" display stand which gives dealers a double check on inventory and conserves shelf space.

NOPCO Bowling League Launches Second Season

Boasting two new men's teams in addition to a woman's division, the bowling league sponsored by the National Oil Products Co. Athletic Association, Harrison, N. J., launched its second season Sept. 29. This year, eight teams will toe the mark in the men's division while the newly-organized women's league will start the season with six teams.

Those who will sponsor teams again this year are Charles P. Gulick, president and chairman of the board; Ralph Wechsler, treasurer; G. D. Davis, T. A. Printon, and Perc Brown, vice-presidents; and A. A. Vetter, secretary.

New Ply Distributors

Milburn Co., Detroit, manufacturers of Ply products for the prevention of skin disorders in industry announce the appointment of two new distributors: In the New England Territory, Otis Clapp & Son, Inc., Boston and Providence, R. I., Farwell, Ozmun and Kirk Co., St. Paul, will represent Ply in Minnestota.

Gulick Vacations

Charles P. Gulick, president and chairman of the board, National Oil Products Co., left with Mrs. Gulick early last month for a much-needed rest and vacation at the Lake Placid Club, Lake Placid, N. Y.

National Aniline Detergents

National Aniline & Chemical Co., Buffalo, N. Y., is now producing detergents in the form of liquid dentifrices, shampoo and laundry powder.

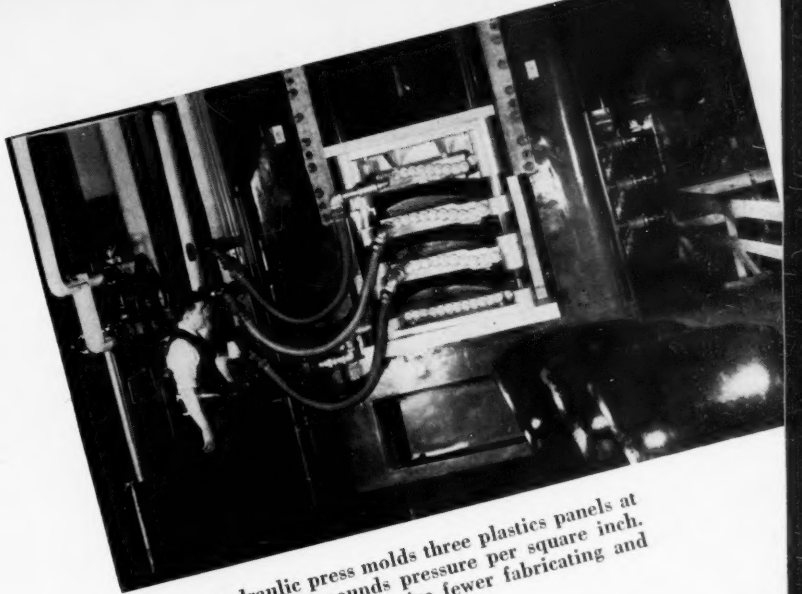
New Products Firm

Tidy House Products Co., Des Moines, Ia., has been formed to manufacture and sell household and commercial cleansing and sanitary products. New business has purchased assets of the American Chemical Co.

Whiskit, a product of Whisk Co., N. Y. City, solves the housewife's problems of what to do for liquor stains, water spots, heat rings and scratches on furniture. This handy kit contains everything needed for removing furniture blemishes.

PLASTIC AUTOMOBILE BODY BY FORD

Ford research engineers recently completed the first plastic motor car body, climax of a dozen years of research calling for wider utilization of farm products in industry. Composition of the plastic is of ordinary farm crops, a typical formula calling for mixture of synthetic resin with fibrous material derived from such crops as wheat, flax, raimi, hemp and spruce pulp. Even the windows and windshield are plastic. *(Ford photos)*

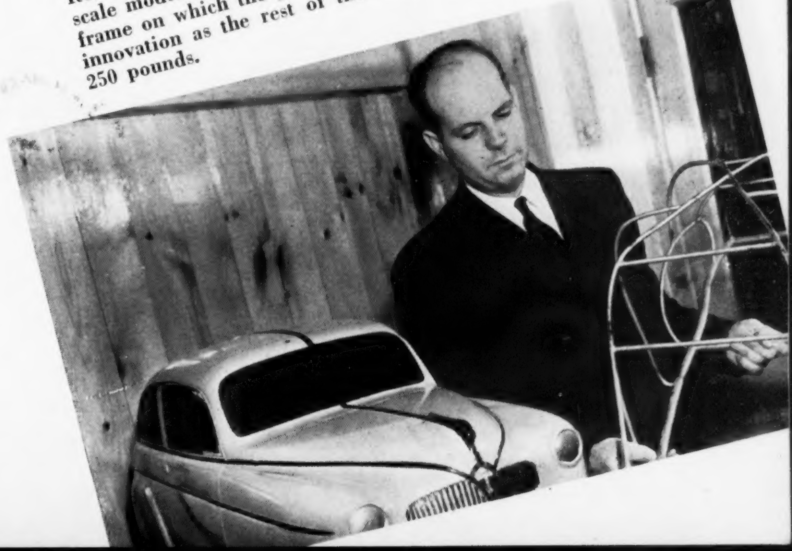


This big hydraulic press molds three plastics panels at a time under 1,500 pounds pressure per square inch. Plastic body is said to require fewer fabricating and finishing operations than steel.

Top photo, farm crops like wheat straw, hemp and sisal go into the Ford plastic body. Typical formula calls for 70% of these fibers and 30% resin binder. Bottom photo, cellulose fibers are prepared in a "beater" and synthetic resin is added. Pulp-like substance formed could also be impregnated with color, but process is still too costly according to Ford chemists.

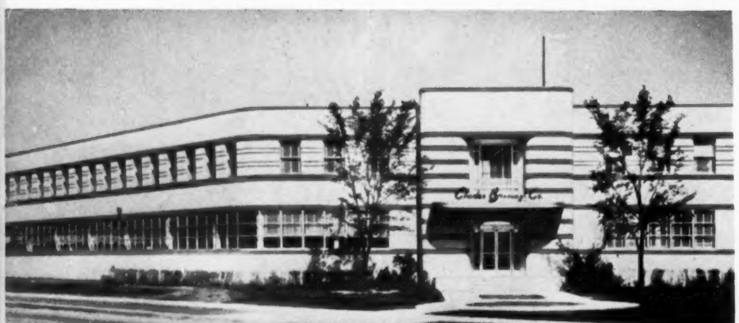
Mixture of resin and fibers has here been pre-formed through a suction operation. This shows manufacture of a rear compartment door. Panels weigh only half as much as steel but after they are molded they have much more impact strength.

Robert A. Boyer, Ford research chemist, is shown with quarter scale models of the plastic body car and the welded tubular steel frame on which the panels were mounted. Frame is as much an innovation as the rest of the body. It weighs, full scale, about 250 pounds.



Private Industry Delivers the Guns

The first 90 mm. anti-aircraft gun mount to be built by U. S. private industry was delivered last month to Army officials by Max W. Babb, president, Allis-Chalmers Mfg. Co. at the company's La Porte (Ind.) works. Photo at left shows crew rushing the mount to completion. Photo above shows gun in traveling position immediately after its unveiling and presentation by President Babb to Col. Donald Armstrong. This marked the beginning of large scale production on this weapon, company officials stated.



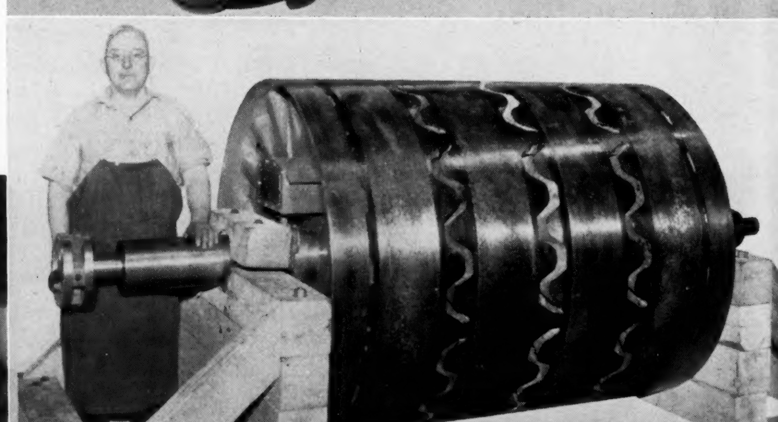
Other Company Developments

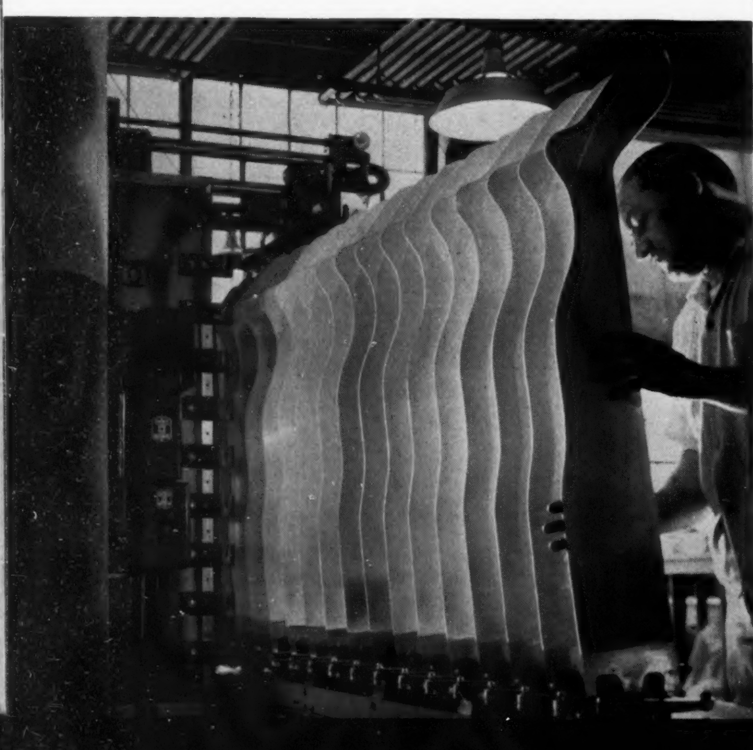
Top left, coating department of Charles Bruning Co.'s new plant, Chicago. Company manufactures sensitized paper. Below that, the paper storage room of the new plant in which the most up-to-date and efficient methods and equipment are used. Bottom left, erection of eight storage tanks has added 250,000 gallons to bulk storage capacity of National Oil Products Co., Harrison, N. J. Directly below, huge plant of Reynolds Metals Co., Longview, Wash., which went into production last month with its first unit turning out aluminum for national defense 30,000 yearly ton rate.

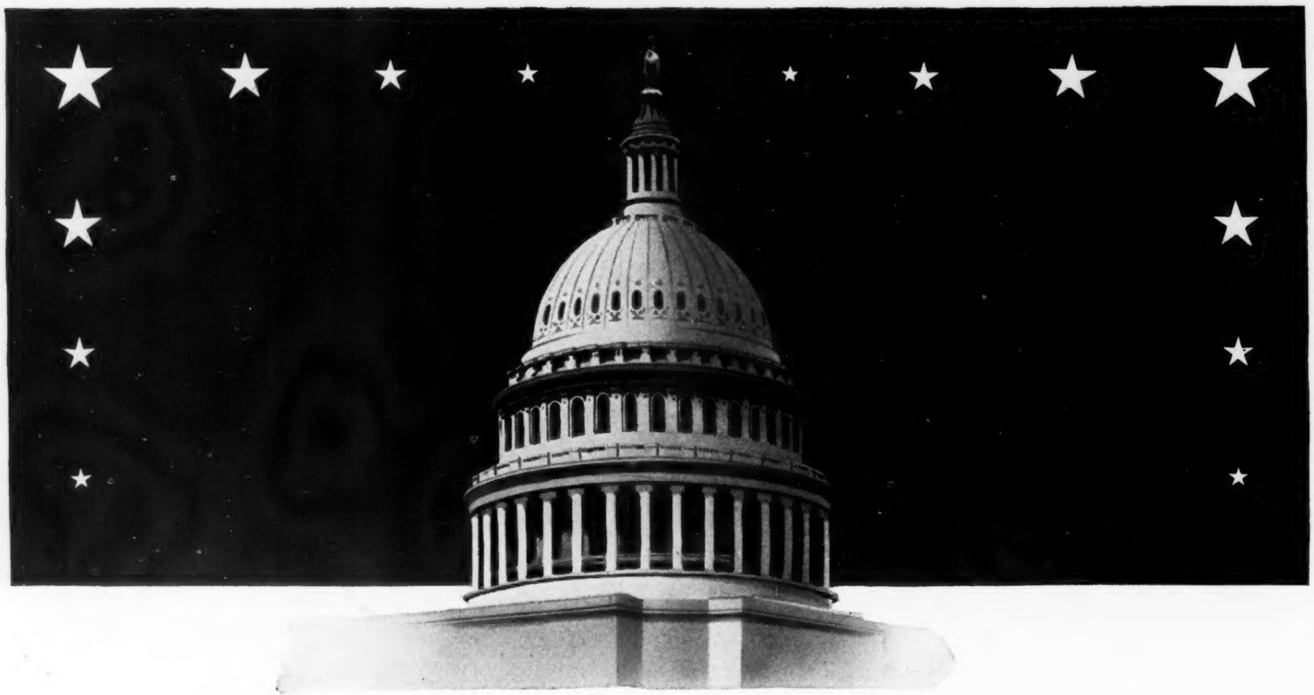
Trap Biggest Lightning Bolt

Left, 585-foot brick smelter stack of Anaconda Copper Mining Co., Anaconda, Mont., upon which Westinghouse engineers have placed copper spikes which literally serve to attract lightning, so that they can "pipe" the bolts to ground on twin copper cables and measure the intensity and duration of direct strokes by a recording device known as a fulchronograph. Above, a tiny strip of magnet steel is placed in the circuit near the fulchronograph (center background) and acts as the "tattletale" for the company's study on lightning in which Anaconda is cooperating.

Right, Use of Plexiglas plastic as a substitute for aluminum in electric fence controllers produced by W. Haddon Judson Co., Philadelphia. Below that, the largest commercial magnet ever built, a Dings Magnetic Separator Co., Milwaukee, high intensity magnetic pulley, 48″ in diameter by 63″ face width. Unit is to be installed by large producer of electric power for use as magnetic head pulley on a coal conveyor belt. Bottom right, device used for unscrambling metal fittings used in lighting systems assembled by C. S. Williams of Westinghouse. Below, pre-boarding equipment in large hosiery mill which gives permanent "set" to full-fashioned nylon hosiery. (DuPont photo.)







NEWS OF THE MONTH

GOVERNMENT

Alcoa No Monopoly

It took the government four years and about $100,000 to find it out, and it took Judge Francis G. Caffey 10 days to say it, but the Aluminum Company of America was cleared Oct. 9 in Federal Court, N. Y. City, of all charges made by the anti-trust division of the Department of Justice. J-men had asked that Alcoa be dissolved and split up among four new corporations that would engage competitively in various branches of the industry.

Begun April 23, 1937 the trial had as its basis government charges that the Aluminum Company of America exercised an illegal monopoly in this country's aluminum industry. The government's allegations in support of its contention that Alcoa had violated the anti-trust laws were divided, by the court, into three main divisions: "monopolization, conspiracy, and other mis-conduct." Final decision was contained in the opinion which took 10 days' dictation by Judge Caffey and which cited the present uses of aluminum and the great probability of its "enormous development in the future."

In his dictation, Judge Caffey said, "In my judgment, it would be greatly contrary to the public interest to dissolve or enjoin Alcoa. There is no warrant in fact or in law for dissolving or enjoining Alcoa. I have assumed since I found out what the case before me was that whatever the decision there would be an appeal. That is a great comfort to me, recognizing, as I do, my responsibility, although I think my decision is right."

Head of the anti-trust division Thurman Arnold indicated that the decision would be appealed in the Supreme Court as soon as possible.

The forty-nine defendants who were cleared of any violation of the Sherman Act in Judge Caffey's opinion included Alcoa, with several subsidiaries and officials, Aluminum, Ltd., a Canadian corporation headed by Edward K. Davis, brother of Arthur V. Davis, who is chairman of Alcoa, three of Aluminum, Ltd.'s officials; Aluminum Manufacturers, Inc., and Aluminum Goods Manufacturing Company.

Judge Caffey said further:

"It appears without contradiction that there exist in this country adequate supplies of bauxite and water power, available to anyone; that there is no way of measuring the influence, on success, of character, good-will, etc.

"Anyone so desiring needs only bauxite [the ore from which aluminum is derived] and water power and it appears that no one stands in the way and that nothing ever has stood in the way with the exception of patents, the last of which ran out in 1909."

He pointed out that entrants into the aluminum industry might expect to meet competition but remarked that the Sherman Act was intended not to stifle competition but to encourage it.

He declared that the task of deciding the case had been made more perplexing by some "wishful thinkers" who came to the witness stand with "preconceived notions," while other witnesses had been biased "because they had been born that way and could not help it."

On the other hand, he said, some competitors who testified had praised Alcoa for its 'fairness and helpfulness" to industry.

Denies Application

Treasury Department early this month denied an application of the General Dye Stuff Corp. to acquire control of the General Aniline & Film Corp. from its present owners, Internationale Gesellschaft fuer Chemische Unternehmungen A. G., a Swiss holding company. No reason was given for the action.

GENERAL

Exposition Dec. 1-6

More than 300 exhibits representing the greatest array of chemicals, chemical products, laboratory equipment, processing machinery, apparatus, instruments and materials to be found anywhere in the world today will be assembled and compacted into more than three acres of floor space at the 18th Exposition of Chemical Industries in Grand Central Palace, N. Y. City, Dec. 1-6. Technical problems created by the program of national defense will make the event of greater importance than any preceding it.

Queeny Book Scheduled

Edgar M. Queeny, president of Monsanto Chemical Co., is the author of a book to be published next month, "Cheechako," a story of an Alaskan bear hunt. It is a limited edition illustrated with photographs by the author and will sell for $7.50. Scribners is the publisher.

Seminars at Brooklyn

Department of Chemistry, Polytechnic Institute of Brooklyn, will hold a series of seminar meetings on "Elasticity and Plasticity" under joint leadership of Professor Hermann Mark, Professor William H. Gardner and Dr. Robert Simha. It will be held on alternate Saturdays from 11 to 1 p. m., first meeting on Oct. 18.

Inspect Monsanto's Chemical Warfare Plant

Brigadier General Brehon B. Somervell, chief constructing quartermaster of the U. S. Army, and Charles Belknap, executive vice-president of Monsanto Chemical Company, inspect the new Chemical Warfare Service plant being erected by Monsanto for the Army at Monsanto, Ill. New plant, nearing completion, will make chemicals used in manufacture of gas protective equipment for troops.

Flies for Defense

Mrs. Wallace P. Cohoe, wife of the New York consultant, recently became a pioneer member of the Maltese Falcons, a group of civilian flyers offering their planes and services to the Civil Air Guard of the Office of Civilian Defense. She is shown here presenting the deed to her plane to Lieut. David M. Cullen, First Division Air Corps.

Calendar of Events

Oct. 16-18, American Institute of Mining & Metallurgical Engineers, Petroleum Division, Dallas, Texas.
Oct. 17, American Assn. of Textile Chemists and Colorists, Regular Sectional Meeting, Chemists' Club, New York City.
Week of Oct. 20th, American Gas Association, Annual Convention, Atlantic City, N. J.
Oct. 20-22, American Photo-Engravers Association, Annual Convention, Drake Hotel, Chicago, Ill.
Oct. 20-24, American Society for Metals, National Metal Congress—National Metal Exposition, Philadelphia, Pa.
Oct. 23-24, Tanners' Council of America, Annual Meeting, Hotel Stevens, Chicago, Ill.
Oct. 23-25, Drug, Chemical & Allied Trades Section, New York Board of Trade, Inc., 6th Annual Fall Meeting & Golf Tournament, Skytop Club, Skytop, Pa.
Oct. 27-28, Federation of Paint & Varnish Production Clubs, Annual Convention and Paint Show, Drake Hotel, Chicago, Ill.
Oct. 27-29, Association Official Agricultural Chemists, Inc., Annual Meeting, Willard Hotel, Washington, D. C.
Oct. 27-29, National Pest Control Association, Ninth Annual Convention, Hotel St. Francis, San Francisco, Calif.
Oct. 28, Association of Consulting Chemists and Chemical Engineers, Inc., Annual Meeting, The Chemists' Club, New York, N. Y.
Oct. 31, American Association of Textile Chemists & Colorists, General Meeting, Pinehurst, N. C.
Nov. 3-5, American Institute of Chemical Engineers, 34th Annual Meeting, Cavalier Hotel, Virginia Beach, Va.
Nov. 3-7, American Petroleum Institute, 22nd Annual Meeting, St. Francis & Palace Hotels, San Francisco, Calif.
Nov. 7, Akron Rubber Group, Fall Meeting, Akron City Club, Akron, O.
Nov. 7, Society of Chemical Industry, American Section, Presentation Chemical Industry medal to Dr. Elmer Bolton, Chemists' Club, N. Y.

ASSOCIATIONS

A. I. Ch. E. Meets Nov. 19

American Institute of Chemical Engineers, N. Y. Section, will meet Nov. 19 at the Chemists' Club, N. Y. City. S. D. Kirkpatrick, editor of *Chemical and Metallurgical Engineering* will speak on "Mobilization of Man-Power and Materials for Defense." A motion picture, "The Fourth Kingdom" will show the development and diversity of applications of Bakelite plastics.

Tappi Medal to Wolf

Gold medal of the Technical Association of the Pulp and Paper Industry will be presented this year to Robert B. Wolf. Medal is awarded by vote to an individual who has made outstanding contributions to the technical advancement of the pulp and paper industry.

Hypochlorite Group Forms

National Association of Hypochlorite Package Manufacturers was formed recently to gather statistics on the use of chlorine as a disinfectant and the uses of sodium hypochlorite in the food industries.

Juniors to Hear Ansbacher

The "Vitamin Field" will be the subject of a talk by Dr. S. Ansbacher, International Vitamin Corp., Nov. 6 before the Junior Chemical Engineers. Meetings are at Childs Restaurant, 109 West 42d St., N. Y. City.

ACS Membership Up

An increase of 3,225 members during the past year is reported by the American Chemical Society, largest professional organization of its kind in the world. The Society, according to Dr. Charles L. Parsons, secretary, now has a membership of 28,525.

COMPANIES

All for Defense

Two additional magnesium plants with a combined annual capacity of 60,000,000 pounds of metallic magnesium have been arranged for by the Defense Plant Corporation. Larger of the two will be located at Lake Charles, La., and will be constructed and operated by Mathieson Alkali Works, Inc. Other plant will be built and operated by International Agricultural Corp. at Austin, Tex. In connection with this plant a chloride plant will be built at Carlsbad, N. M.

Signing of a contract with the Defense Plant Corporation last month for the construction of a new plant at Louisville, Ky., will boost the synthetic rubber production capacity of the Hycar Chemical Company to four times the synthetic rubber production in the entire nation last year.

Sherwin-Williams Co., Cleveland, will build and operate a bomb and shell loading plant at Marion, Ill., to be known as Illinois Ordnance Works.

At least one new chlorine plant will be constructed by the government to provide

He's in the Army but Still a Newspaperman

(*Photo courtesy "Collier's" magazine, taken by Grace and Knickerbocker Davis*)

Chemical Industries' **assistant editor Charles J. Cunneen (left) now with the 44th Division at Fort Dix is hard at work as news editor of the division's official tabloid, *First Call.* Recently *Collier's* magazine ran a feature story "Our New Army" in which this and other photos of the boys at work were featured.**

sufficient aluminum chloride for the expanding needs of the refining capacity of 100 octane gasoline, Petroleum Coordinator Harold Ickes revealed recently.

Military Chemical Works, Inc., Kansas City, has been awarded a contract to construct and equip the Jayhawk Ordnance Works at Baxter Springs, Kans. Plant will manufacture anhydrous ammonia and ammonium nitrate.

Baytown Ordnance Works, Baytown, Tex., to manufacture toluol by a process of Humble Oil & Refining Co. and Standard Oil Development Co., has been completed five months ahead of schedule.

Hydrocarbon Changes Name

Corporate name of Hydrocarbon Chemical & Rubber Co., Akron, O., jointly-owned enterprise of B. F. Goodrich Co. and Phillips Petroleum Co., has been changed to Hycar Chemical Co.

Solvents Chart

Commercial Solvents Corp., N. Y. City, has issued a comprehensive wall chart listing the important physical properties of 83 solvents, diluents, and plasticizers and a wealth of data, much of which has never been published before.

Appoints American Cyanamid

American Zinc, Lead & Smelting Co. has appointed American Cyanamid Co. N. Y. City as sales and technical representatives throughout the world for Heavy Media Separation (Sink-Float) Processes formerly offered to the mining industry by American Zinc, Lead & Smelting as the MBI Patented Sink and Float Process.

Hercules Opens Plant

Hercules Powder Co., early this month, placed in operation a new plant for the production of rosin esters at Hattiesburg, Miss. New unit which adjoins the company's naval stores plant will increase its rosin ester production 60%.

Bauxite from Guiana

Pennsylvania Salt Co. has formed a subsidiary company with American Cyanamid & Chemical Co. for the mining and refining of bauxite from a deposit on the Berbice River, British Guiana. Known as Berbice Co., Ltd., it is expected to be ready for operation early in 1942.

A Correction

On page 312, September issue, Vol. XLIX, 3, third column, "Schedule H-1 (Dump Energy)—when available, and at the discretion of the Administrator 2.5 mills net per kilowatt-hour delivered." This has been withdrawn as no longer available.

Other Company News

Garfienkel Chemical Co., N. Y. City, has enlarged its offices at 1775 Broadway. Technical department under the personal direction of L. Garfienkel, president, is on the revalorization of by-products resulting from the treatment, the fractioning, and distillation of essential oils and aromatic products.

Theme of the exhibit of Bakelite Corp., unit of Union Carbide & Carbon Corp., N. Y. City, at the 1941 Paint Industries' Show will be based on the research and development now being applied on synthetic resins for essential coatings. The show is to be held in the Hotel Drake, Chicago, October 27-29.

Cardox Chemical Co., Chicago, is constructing a unit for the production of potassium perchlorate at Claremore, Okla., at a cost of $250,000.

Merco Nordstrom Valve Co. and Pittsburgh Equitable Meter Co. have moved to new quarters at 3136 East 11th St., Los Angeles.

Sales and export offices of American Firstoline Corp., manufacturers, distributors and exporters of chemicals and pig-

ments, from Long Island City to the Graybar Building, 420 Lexington Ave., N. Y. City. Laboratory and storage facilities will continue to be maintained at the Long Island City address, where expansion is under way.

Blaw-Knox Co., Pittsburgh, Chemical & Process Engineering Department, has been awarded contracts of about $3,000,000 for chemical processing equipment. Contracts were placed by the Naugatuck Chemical Division of the U. S. Rubber Co., which has selected Naugatuck, Conn., as the site of its synthetic rubber factory; and by the Firestone Tire & Rubber Co., which will build one of the government-sponsored plants at Akron, O.

PERSONNEL

A. Brickman, established in Rio de Janeiro in the wholesale and importing chemical business, sailed from that city for New York, Oct. 8.

Walter E. Murray has been appointed textile sales manager of Warwick Chemical Co., West Warwick, R. I.

H. Bennett, Crowley & Bennett, technical consultants has just returned from a trip through Central America. In Costa Rica he called on President Calderon Guardia to discuss the possibility of assisting in establishing small industries utilizing native products, labor, capital and equipment and keeping all profits within the country. Industries that will be started first are the production of shark-liver oils balsams, essential oils, vegetable gums and resins and rubber.

William Kennedy, advertising manager, Barrett-Cravens Co., Chicago, was married at Notre Dame, Sept. 20, to Miss Mary Ryan.

C. D. Prickett, vice-president and director Hercules Powder, retired effective Oct. 1. Prickett had been with this company since its formation in 1913, when he was put in charge of all Hercules' black powder operations.

Charles C. Concannon, chief consultant on chemicals, Department of Commerce, will conduct a survey of the chemical industry in the South under the new program to establish broader contacts between government and chemical industry.

Dr. E. C. Williams, formerly vice-president, Shell Development Co.. has been elected vice-president and director of research for General Mills, Inc., Minneapolis . . . **H. W. Cecil** has joined the sales department of Phillip Brothers, N. Y. City . . . **James B. Christie** has joined Chas. Hardy, Inc., where he will be in charge of all research and development.

W. N. Doushkess has been appointed manager of a department for the production of a limited number of industrial chemical specialties of S. B. Penick & Co., with headquarters at 50 Church st., N. Y. City.

Charles B. Hemming, for 15 years research and development chemist with Du Pont, has been appointed chief chemist of U. S. Plywood Corp. . . . **Donald S. Collard,** for a number of years plant superintendent at West Warwick for Warwick Chemical Co., has been transferred to the Rock Hill, S. C., plant of the company in a similar capacity.

Dr. Champion H. Mathewson internationally known metallurgist and head of the department of metallurgy at Yale University, was honored by the 115 members of the Yale Metallurgical Alumni Oct. 3 and 4.

Felix N. Williams, manager of Monsanto Chemical Co.'s elemental phosphorous plant at Monsanto, Tenn., has been made production manager of the phosphate division of the company . . . **A. T. Beauregard,** assistant plant manager of the Monsanto, Tenn. plant has been made plant manager . . . **Arthur P. Kroeger,** assistant general branch manager of the company's Los Angeles office, has been named assistant manager of sales in charge of intermediates, with headquarters in St. Louis . . . **Charles L. Fetzner** has been transferred from the San Francisco office of the company to the Los Angeles office as assistant general branch manager to replace Kroeger.

J. F. Stephyl, Stephyl Laboratories, Milwaukee, is now technical sales representative in that city for Glyco Products Co., Inc., Brooklyn. He will act in conjunction with E. S. Johnston, Midcontinent Chemicals Corp.

Dr. Donald F. Othmer, chairman of the department of chemical engineering at the Polytechnic Institute of Brooklyn will address the Junior Chemical Engineers of New York City at their first regular meeting of the season to be held Oct. 15. His subject will be "Wood as a Raw Material for the Chemical Industry."

Lalor Fellowships

Under the program for the Sixth Annual Series of Fellowship Awards of The Lalor Foundation nine eminent leaders in scientific research have been named, each to nominate the recipient and administer one Fellowship of the 1942-43 Series of Lalor Research Awards. These research scientists are: Dr. Detlev W. Bronk, University of Pennsylvania; Dr. E. J. Cohn, Harvard Medical School; Dr. Edward A. Doisy, St. Louis University School of Medicine; Dr. W. F. Giauque, University of California; Dr. A. Baird Hastings, Harvard Medical School; Dr. Carl S. Marvel, University of Illinois; Dr. Harold C. Urey, Columbia University; Dr. H. B. Vickery, Connecticut Agricultural Experiment Station; Dr. Roger J. Williams, University of Texas.

Phil LoBue has been made manager of the new Eastern branch office of Michigan Chemical Corp., St. Louis, Mich.

OBITUARIES

Charles H. Roberts

Charles H. Roberts, 51, treasurer of Johns-Manville Corp., died Sept. 10, at Doctors Hospital, N. Y. City, where he had been confined since Aug. 20 for treatment of a heart ailment.

Dr. Rudolf Schoenheimer

Dr. Rudolf Schoenheimer, associate professor of biological chemistry at Columbia University, was found dead of poisoning at his home in Yonkers, N. Y., Sept. 11. He was 43 years old.

George E. Collings

George E. Collings, 87, one of the founders of the Dow Chemical Co. and vice-president until his retirement last May, died Sept. 24 at his home in Cleveland.

Markets in Review

Heavy Chemicals — Fine Chemicals — Coal Tar Chemicals — Raw Materials — Agricultural Chemicals — Pigments and Solvents

By Paul B. Slawter, Jr., Market Editor

WHETHER you like it or not, the priority rules and regulations, preference rating orders and other legal documents issued by the Priorities Division are in effect to remain in effect until and unless circumstances warrant changes. This is the essence of Priorities Director Nelson's recent statement calling for wholehearted compliance with the priorities system and his announcement of a nation-wide survey designed to check factual data which will be useful in enforcing priorities orders and regulations. The government means business here and it will get compliance, or else. Summing up the priorities situation: ¶ There will be increased emphasis on allocation of materials and classification of end uses. ¶ The priorities instruments used now will continue to be used as parts of the system. ¶ Changes made will be worked out gradually, over a period of time. ¶ All existing regulations and orders and certificates must be scrupulously obeyed. Violators will be held to account, punitive action being used if necessary.

Business continues to puff along at record levels, that is, most business does. Those companies unfortunate enough to be in non-defense industries needing strategic materials have been rocked and socked by priorities and regulations until they are groggy. A priority branch of the labor division of OPM was set up recently to receive all complaints of difficulties resulting from priority allocations. Attempts are being made to make things better. One plan, already in effect and known as the "Buffalo Plan," provides for managements of defense plants, labor organizations of displaced workers and the U. S. Employment Service cooperation in registering workers and classifying them by skill for placement. Other methods suggested include close adherence to a maximum 40-hour week. Business profits continue to go up along with other rising figures. Twenty-nine chemical companies in a recent survey reported profits of \$82,900,000 in the first six months of 1941 as compared with \$81,300,000 in the same period of 1940. Industry, according to a recent NAM survey, is spending \$117,-490,000 for research, or roughly, 1.1% of total gross sales. Chemical companies covered in the survey are spending an average of 2.4% of gross receipts for research. The survey showed that 49% of the companies had a bigger research budget in 1941 than in 1940 while 43% reported their figures the same.

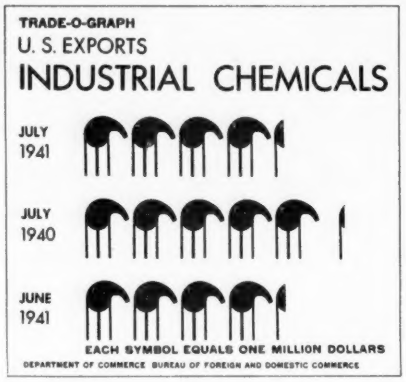
Shipping continues to be a problem to all industry and outlook is no different say chemical export executives. To obtain cargo space for materials needed by Latin America, Russia and South Africa, the Maritime Commission is considering application of shipping priorities to export business. This may well be what you've been expecting and don't say we haven't warned you. If the reports of tremendously increased submarine activity (Nazi submarines, of course) in the North Atlantic are true then there's trouble ahead. More lease-lend stuff will go to the bottom followed by more submarines which event is likely to be followed by almost anything. The President is expected to call for arming of U. S. ships any minute now. The Panamanian government

will revoke its registry of foreign-owned ships if these are armed by their owners. Some changes in government may affect this, however. Tonnage offerings in all branches of the world's charter market are extremely scarce. A large shipment of turpentine for Britain went down recently, it is rumored.

Office of Price Administration ran the gamut of chemical price control last month and this by adding to its list which is bound to grow larger. Maximum prices approximating the levels generally prevailing in the third quarter of this year were imposed on 12 leading classifications of ethyl alcohol, including a top price of 24½ cents a gallon "at works" on SD 2B, the basic formula among the 12. Methanol made from wood (wood alcohol) was put under price control effective Oct. 10 with an established uniform ceiling at 60 cents a gallon for wood alcohol delivered East of the Mississippi in price schedule No. 34. Many in the trade feel that the ceiling is low and it is doubtful that all producers can operate profitably at this price. Synthetic methanol was not given a ceiling and it is not expected to get one just yet. Leon Henderson, in announcing the ceiling, warned that with formaldehyde, ethyl alcohol and acetic acid already under price ceilings, maximum prices would be established for other industrial chemicals shortly. (Ceiling prices embracing bulk sales of acetic acid fixing maximum prices of 7¼ cents a pound for acid of wood origin and 6¼ cents a pound for the synthetic type when sold in tank cars, went into effect Sept. 29.) OPA shortly will establish a ceiling on zinc ore in the tri-State district (Wisconsin, Kansas and Oklahoma) which will be followed almost immediately by a maximum price schedule on slab zinc. On Oct. 3 all lead supplies were placed under full priority control as a result of failure of domestic production to keep pace with increased consumption. This was no surprise to the industry as it was expected and should have been no surprise to you as it was heralded. Current use is at the rate of 960,000 tons a year. Current production is about 600,000.

Misunderstanding among research laboratories as to the proper method of applying for the A-2 preference rating assigned to deliveries of materials and equipment in Preference Rating Order P-43 has prompted this memo from OPM. All applications should be filed on PD-88 and directed to the Chemical Branch, OPM, Washington.

The Department of Justice last month was asked to take action under the antitrust laws against "priority profiteers" who have raised prices of some chemicals from 100 to 400%. Hundreds of complaints are being investigated and action may be expected shortly.



Heavy Chemicals: A wave of shortages in many vital chemicals is expected soon and when it comes, it'll hit hard. The War Department complaining that companies fail to assure production are being told that all industrial plans were based upon supplying the American army, not every one that opposes the Axis. Chlorine, by far the worst bottleneck is still the same old problem and its shortage continues to be felt in bleaching powder and other chlorine compounds. A long list of coal tar products is running a close second as "most scarce chemicals this month." Civilian industries which soon may short-ration it are probably: users of dyes, plastic manufacturers, paper manufacturers, glass industry and soap. OPA authorities are urging consumers to resist antifreeze price increases. They are being asked to report instances of profiteering to Leon Henderson. Soldiers' kits are partially responsible for a shortage of calcium hypochlorite. Each one has a supply for sanitation purposes. Calcium chloride will be in greater demand because of the recent dry spell, also for use in concrete work, for ice control and many other special uses of the chemical. Over 60% of our chlorine is going into defense work, incidentally.

Expansion in U. S. aid to Britain, Russia and China will take greater quantities for export of nitration toluol, synthetic ammonia, mercury, acetic acid, formaldehyde and other munitions chemicals. Expanded lend-lease program will call for more of these products from industry.

Metal derivatives are all scarce. Diamond Alkali revised its prices on sodium metasilicate, bbls., cl., f. o. b. wks., to $2.50 cwt.; on sodium sesqui-silicate, dms., $3.05 cwt.; and sodium orthosilicate, dms., $3.15 cwt. Du Pont reduced prices of pure synthetic methanol to 28 cents a gallon in tank cars from 30 cents. Prices on saltpeter are extended for the final quarter but the end of the year will see some revision here. Sulfuric acid manufacturers whose output in large quantities has been going into superphosphate for fertilizer find attractive price offerings in other lines. Deliveries of potash for chemical and agricultural purposes expanded 77.2% in the first half of 1941, a record unequaled in the chemical industry. Additional production of copper sulfate is expected in November but it won't help the market much. It has been too short too long. Refined sulfur prices were advanced five cents per cwt. Oct. 1. Alkali manufacturers are said to be turning down export business for increased domestic needs. Chemical manufacturers all are being forced to increase prices on returnable drums and carboys. Steel shortages for these items plus large numbers frozen in foreign ports make them scarce. Higher costs will be felt in such products as caustic soda, potassium carbonate liquid, orthodichlorobenzol, phosphoric acid and many others.

Fine Chemicals: It was generally expected that along with the price ceiling on methanol would come a similar stopper on glycerin. Glycerin manufacturers had met with OPA men late in September. Nothing was announced at the time but at this writing it looks like glycerin is next. The high level of castor bean imports will continue, so it looks. However, Brazilian castor oil production is increasing, if that means anything to you. Advanced quotations were sent out on amyl acetate (from pentane), ortho amyl phenol and normal butyl carbinol. Little mercury is available and what there is offered sells for prices around $195 and $197 per flask in small lots. A falling

Important Price Changes

ADVANCED

	Sept. 30	Aug. 31
Amyl Acetate (expentane)		
L. c. l. dms. lb	$0.145	$0.135
C. l. dms. lb.	.135	.125
Tks.	.125	.115
Amyl Phenol, ortho		
L. c. l. dms.	.25	.15
Amyl Alcohol		
L. c. l. dms. lb.	.27	.25
Acetone, dms. lb.	.09½	.08½
Lauric, dms. lb.	.18¾	.18½
Oxalic Acid, bbls. lb.	.14½	.14
Tartaric Acid USP bbls.	.70½	.63½
Albumen, lt. bbls. lb.	.75	.70
Egg. ed. lb.	1.75	1.70
Cinnamic, bots.	3.60	3.40
Alcohol		
Diacetone Pure lb.	.13	.12
Ethyl 190 Pf. Mol. tks. gal.	7.86½	5.96½
Alum, Ammonia Lump		
Cl. bbls. 100 lb.	4.25	3.75
Ammonium Oxalate		
Cryst., powd. lb.	.29	.25
Blood, dried N.Y. unit	4.25	3.50
Calcium Acetate		
C. l. dlv. 100 lb.	4.00	3.00
Camphor, Powd, lb.	.78	.74
Carbon Tetrachloride lb.	.73	.66½
Chlorine Liq.	2.00	1.75
Multi	2.35	1.90
Cream Tartar	.57	.52½
Egg Yolk dom.	.95	.90
Fish Scrap, dried, ungd.	4.85	4.65
Glycerin CP lb.	.19½	.14½
Mastic lb.	2.60	1.65
Linseed Meal, bgs. ton	32.50	28.00
Magnesite, ton	80.00	75.00
Mercury	195.00	192.00
Methanol, den. dms. gal.	.73	.45½
Pure dms. cl.	.55½	.35½
Methyl acetone dms. gal.	.81	.66
Naphthalene, dom. lb.	2.75	2.50
Rochelle Salt, Cryst, lb.	.43½	.39½
Saltcake, bulk, wks. ton	15.00	13.00
Sodium Metasilicate,		
gram. 100 lb.	2.50	2.35
Tankage Grd. N. Y.	4.10	3.85
Tartar Emetic	.47¾	.44¾
Turpentine Spirits	.83	.75½

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U.S.I. CHEMICAL NEWS

October ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1941

Coatings Industry Shows New Interest In Natural Resins

Broader Use Seen as Result of Shortage of Synthetic Resins

Manufacturers of paint, varnish, and lacquer are displaying great interest in natural resins, according to Mr. A. J. Wittenberg, of Stroock & Wittenberg Corporation. This has come about largely as a result of the present synthetic resin situation. Because of temporary shortages of certain raw materials, synthetic resins have been greatly curtailed for the past three months. More recently, OPM Regulation No. 1 was issued, making certain types of synthetic resins subject to priorities for defense and high-rated civilian uses.

In finishes for non-defense use, manufacturers will encounter difficulties in securing synthetic resins, and many of them have already reverted to formulas employing natural resins, which were used exclusively prior to the introduction of synthetics. With the many new oils now available, the formulator has wide latitude with natural resins.

The Government, aware of the resin situation, considers natural resins as a critical item. This recommendation has been made by OPM and accepted by the Maritime Commission, with the result that space is being allotted on available steamers for transportation of natural resins to this country.

Stroock & Wittenberg Corporation, in addition to manufacturing a complete line of synthetic resins, has handled all of the popular natural resins for many years, and endeavors to maintain stocks of them at all times. Among the resins which have recently found wide use for new purposes are Congo Gum (raw and processed), Damars, and East Indies (Pale, Black, and Batu).

Technical data on the applications of the natural resins may be obtained from Stroock & Wittenberg Corporation.

Rubber Manufacture, Use Described by Dr. Fisher

The history, manufacture, properties, and applications of rubber are clearly and concisely explained in the recently published *Rubber and Its Use*, by Dr. H. L. Fisher, of U.S.I.'s research staff.

Written in non-technical language easily understood by those unfamiliar with the rubber industry, the book fills the need for a general, authoritative survey of the industry. It is the outgrowth of Dr. Fisher's many years of experience in lecturing on the chemistry and technology of rubber. Among the subjects covered are: properties of crude and vulcanized rubber; compounding and vulcanizing; manufacturing processes; synthetic rubbers; and rubber derivatives.

Dr. H. L. Fisher

Acetoacetarylides Assume New Importance in Dye Manufacture

Increasing Use of Yellow Pigment Dyestuffs Widens Market For Intermediates Produced by U.S.I.; Many Shades Possible

With the yellow pigment dyestuffs expanding their utility as chrome yellow production is absorbed largely by requirements for olive drab pigments, the acetoacetarylides manufactured by U.S.I. are taking on new importance as pigment dye intermediates. The Hansa Yellows have been used for many years, and newer toluidine and benzidine yellows have also come into favor, where color tone, brilliance, and durability are of primary importance. With current conditions introducing the advantages of these yellows into new fields, the present trend toward their use may well become permanent.

U.S.I. research in dyestuff intermediates has been an important contributing factor in the growth of these yellows. Not only have improvements in manufacturing processes at U.S.I. made possible reductions in the cost of the acetoacetarylides, but the introduction of new compounds in the group has opened to the makers of organic pigments a wider range of shades among the yellow pigment group.

Preparation of the Yellows

In general, the Hansa and the newer yellows are prepared by coupling an acetoacetarylide with a diazotized amino compound, preferably containing nitro groups, which help to retain the insolubality in oil, and thus to prevent bleeding. One of the most widely known of the acetoacetarylides is acetoacetanilide, which U.S.I. has produced on a commercial scale for a number of years. U.S.I. Acetoacetanilide is prepared by reacting ethyl acetoacetate (itself an important intermediate in dyestuffs and pharmaceuticals) with aniline, eliminating ethanol. When acetoacetanilide is coupled with diazotized meta-nitro-para-toluidine, Hansa Yellow G is formed. Slightly different shades are obtained by using other diazotized amino compounds.

While a change in the diazotized amino compound employed offers the dyestuff manu-

(Continued on next page)

Visit the S & W Booth At Paint Conventions

Those attending the paint industry conventions to be held this month are cordially invited to visit the exhibit of Stroock & Wittenberg Corporation at Booth 18. Dates are October 27-28 for the meeting of the Federation of Paint and Varnish Production Clubs; October 29-31 for the National Paint, Varnish and Lacquer Association. Place is the Drake Hotel, Chicago.

Suggests Use of Lignin As Lacquer Ingredient

ERIE, Pa.—A hitherto undiscovered use for lignin — by-product of the pulp and paper industry — is revealed by an inventor here, who has patented the use of lignin as a lacquer ingredient.

When recovered by processes described in the patent, the lignin can be dissolved in organic solvents commonly used in nitrocellulose lacquers, and the solutions are compatible with solutions of cellulose esters. For example, a lacquer may be prepared with the following proportions:

	Per cent
Amyl acetate	45.0
Turpentine	25.0
Methanol	20.0
Cellulose nitrate	5.0
Lignin	5.0

It is possible, the inventor claims, to use the lignin in conjunction with natural or synthetic resins.

Spray lacquering, always a popular method of touching up or completely refinishing cars, may become even more important in this field as cars are kept in service longer. One difficulty in spray refinishing has been the problem of masking glass surfaces, such as headlight lenses and windows, to protect them from the lacquer. This difficulty can be overcome, it has been reported, by coating the glass with a composition of 2.0 parts of kaolin, 1.5 parts of glycerin, 4.5 parts of water, and 0.25 part of butanol. The composition is applied with a brush, and can be removed with a putty knife or by washing with water after the spraying operation has been completed. Composition can be used to mask metal surfaces also.

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Urethan and Dye Used in New Duplicating Process

CHICAGO, Ill. — An unusual application for urethan in the preparation of master copies for hectograph or spirit duplication processes has just been revealed in a patent granted to inventors here and in Cincinnati.

In previous reproduction processes using water- or alcohol-soluble dyes to form the designs, the inventors point out that difficulty has been encountered in obtaining sufficiently heavy dye ink deposits. In the new process, the design is formed by fusing on the master sheet a powdered dye composition. A suitable composition can be prepared by melting 200 parts of urethan in a water bath and adding 250 parts of crystal violet.

The process appears to open an entirely new field of utility for urethan, a U.S.I. product which in the past has been used chiefly as a fixative in dyeing human hair, an ingredient in pharmaceuticals, and an intermediate in organic synthesis.

Improves Solubility of Azo Dyes in Organic Solvents

PENNS GROVE, N. J. — The azo dyes can be made much more soluble in organic solvents, and hence more valuable for the staining of wood, if the sodium in the commonly used forms is replaced by hydrogen.

This discovery, which has been patented by an inventor here, is expected to overcome the previous disadvantages in the use of azo dyes for wood staining. In the form of sodium salts, the dyes are only slightly soluble in the organic solvents, and when applied in water solutions, they have a tendency to raise the grain of the wood. When the azo dyes are treated with an acid, however, the resulting products are easily dissolved in ethanol, butanol, and other organic solvents, and the solutions can be applied to wood without raising the stain, the inventor points out.

Indolylbutyric Acid Made With Aid of Ethyl Oxalate

Supplementing the uses of ethyl oxalate described in the August issue of U.S.I. CHEMICAL NEWS, an anonymous correspondent points out that indolylbutyric acid can be prepared by combining ethyl oxalate with cyclohexanone and phenylhydrazine in the presence of zinc chloride. Indolylbutyric acid is an important plant growth hormone.

Ethanol Bath Prevents Shrinkage of Cellulose

DONELSON, Tenn. — The tendency of cellulose films to shrink with age can be almost completely eliminated by a simple treatment in a bath consisting chiefly of water and a volatile water-miscible liquid, such as ethanol or acetone, it has been discovered here.

The bath, according to a patent which has been issued on the process, may consist of 54% water, 38% ethanol, and 8% glycerol. Acetone may be used in place of ethanol in the same proportions.

Dyestuff Intermediates

(Continued from previous page)

facturer an opportunity to obtain different shades, U.S.I. has recognized the desirability of making a still wider choice available by supplementing its list of acetoacetarylides. In addition to acetoacetanilide, four other acetoacetarylides are now in commercial production at U.S.I.: acetoacet-ortho-chloroanilide, acetoacet-para-chloroanilide, acetoacet-ortho-toluidide, and acetoacet-ortho-anisidide. These compounds may be used in the same general way as acetoacetanilide to produce the desired shades of Yellows. For instance, acetoacet-ortho-chloroanilide may be coupled with diazotized para-chloro-ortho-nitraniline to give Hansa Yellow 10G, a very bright and green shade.

Other Acetoacetarylides

Besides the intermediates in commercial production, U.S.I. has prepared the following acetoacetarylides on a laboratory scale:

- Acetoacet-para-phenetidide
- Benzoylacetanilide
- Biacetoacetyl-meta-toluylenediamine
- Biacetoacetyl-para-phenylenediamine
- Acetoacet-para-nitroanilide
- Acetoacet-2, 5-dichloroanilide
- Acetoacetyl-alpha-naphthylamine
- Acetoacetcumidide (pseudo)
- N,N'-Biacetoacetbenzidide
- Ortho-phenylacetoacetanilide

U.S.I. is prepared to supply samples of these compounds for laboratory investigation.

While such factors as temperature, agitation, and drying time have an effect on the ultimate clarity of yellow pigments, it has been the experience of manufacturers that purity of the intermediates is the most important influence. The production methods developed by U.S.I. make it possible to hold impurities to extremely small limits, and hence assist the dyestuff manufacturer in obtaining the desired shade and clarity.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A new baking enamel is suggested by the maker as a substitute for chromium plating. It is said that one coat gives a smooth finish that will stand heavy wear and has high gloss and color retention. **(No. 500)**

U S I

A concrete finishing technique consists in applying a stain followed by a synthetic enamel. The stain, it is claimed, penetrates deeply into the concrete, so that the color does not wear off for long periods of time. The enamel is said to be resistant to the effects of moisture, lime, alcohol, gasoline, and many other chemicals. **(No. 501)**

U S I

A dry ointment is described as suitable for treating industrial dermatitis when the workman must remain at the job. It is said that the ointment was extensively tested under widely varying conditions before being placed on the market. An oily ointment, for use where the infected area is to be covered with bandages, is also available. **(No. 502)**

U S I

A new tester offers a simple means of determining the viscosity of paints, varnishes, lacquers, and solvents, it is claimed. Unit consists of a cup with a calibrated orifice. Cup is lifted by means of a handle from the material to be tested, and operator records time necessary for material to flow through orifice. **(No. 503)**

U S I

A white pigment is said to have been developed especially for use in formulating priming paints for exterior woods. According to the maker, it imparts to the paint the non-penetrating properties desirable in this application, and has the additional advantages of low cost, easy dispersion, and good brushing characteristics. **(No. 504)**

U S I

Lacquer emulsions of cellulose ethers and esters can be made to remain stable for as long as a year by the addition of small quantities of a new product to the water phase of the emulsion, it has been announced. **(No. 505)**

U S I

A masking enamel is designed to provide a protective coating for the back of articles to be electroplated in order to conserve nickel or other electrodeposited metals. It is said that the enamel will resist all plating solutions and cleaners, and that it serves as a permanent enamel after the plating and cleaning operations. **(No. 506)**

U S I

A colloidal suspension can be added to adhesives, such as glue, casein, or latex, to increase their adhesive properties, it is claimed. **(No. 507)**

U S I

A plastic coating can be applied to metals either as a primer coat or for protection against corrosion. It is said that the coating is flexible and almost completely non-porous, and that it can be handled within a few minutes. **(No. 508)**

U S I

A new textile treatment is said to increase the life of the fabric, and at the same time to confer moth-repellent properties and improve resistance to shrinking. Process is described as consisting in depositing minute particles of latex solids which rivet the fibers together. **(No. 509)**

off in domestic output is probably in sight. Acetone prices were raised a cent a pound. The situation in the fine chemical market is, roughly, this: ¶ shortages are prevalent throughout the entire list; ¶ most producers are serving *only* regular customers and these on a rationing basis; ¶ resale stocks are diminishing rapidly with total disappearance in view as few manufacturing consumers can get more than their actual manufacturing needs; ¶ consumption is at record proportions with defense needs getting first shot; ¶ government plans indicate that a constant increase in manufacturing requirements is expected.

Coal Tar Chemicals: Coal tar derivative compounds shortly may come into the news as being next to chlorine in the list of scarce chemicals. Tar acid prices, including various cresylic acid grades, cresols and phenol were advanced by some while other producers held prices already in effect. Business in this market continues to depend upon what the defense program calls for and most materials are allocated accordingly. Labor trouble, once more, in one production branch provided another problem for the market. This will affect coal tar intermediates. Aniline salts are hard to get in the open market. Major factors are not shipping any toluol to any but defense industries. All other coal tar products seem to be going out on an allocation basis with no new orders being accepted. Production is holding at top levels and it seems safe to assume that this will continue to be the case. All in all, it looks like the situation as pictured right now will be the situation until the end of all this mess, unless it gets worse.

Raw Materials: Withdrawals of turpentine from government stocks continue. During the last week of September, 3,826 barrels were taken bringing the total down to 8,782. Whether there will be increased gum naval stores production in 1942 or not seems to be a matter of conjecture. Favorable indications may or may not be taken from Secretary of Agriculture Wickard's endorsement of preparations for a 400,000 unit crop which would be an increase of 115,000 units or 40% over 1941. Some operators point out that such production is impossible. Labor conditions and lease prices are controlling factors. Last month saw the arrival of the largest shipment of gum arabic and gum mastic on record. It came in following a voyage that started from the Island of Cyprus more than six months ago. Carnauba wax from Brazil should continue to come in adequately; at least there is nothing to suggest that it won't. Transportation problem remains the biggest one in this market.

Fertilizer Materials: Domestic potash production increased 77% during the first half of 1941. Deliveries of potash for agricultural purposes were 192,995 short tons on the K_2O basis which is equivalent to 345,884 tons of potash salts. Increased fertilizer supplies for Japan are being given attention by officials there. Efforts to increase phosphate production in Chosen, China and Indo-China are under way. Nitrogen supplies for fertilizer are approaching complications. Priority regulations may be near. Capacity to turn out potash, phosphate rock, nitrogen and sulfur is good but the difficulty seems to be in securing the water and rail transportation to mixing plants. All fertilizers and fertilizer materials except low-analysis potash salts are now under export control. Blanket licenses have been issued which permit shipment of practically all fertilizers and materials to Canada, Great Britain and the Philippines without individual licenses. Some may be shipped to South American and Central American countries and a number of other countries specifically listed under blanket license. Exports to the Axis powers, of course, are forbidden. NFA is trying to have the fertilizer industry covered in a blanket license by OPM's Priorities Division so that material and repair parts can be obtained for factory maintenance. General scarcity of sulfuric acid is felt in superphosphate production. Triple superphosphate is practically unobtainable.

Solvents: Leading chemical makers of anti-freeze compounds seem to have put aside enough alcohol, methanol and ethylene glycol for American motorists this Winter. Current alcohol shortage is to be averted, it has been reported, through arrangements made with the Commodity Credit Corporation to permit whiskey distillers to convert 20,000,000 bushels of corn into alcohol for use by the Ordnance Department. This should provide between 40,000,000 and 50,000,000 gallons of alcohol in addition to amounts supplied by industrial manufacturers. (The list of price control regulations and priority rulings affecting this industry already has been included elsewhere in these columns.) Methanol, under mandatory control, is said to be present in sufficient quantities so that a stringent program of allocation will not have to be used, for the present.

Paint Materials: Reduced imports of oils from the Far East are being felt in the industry which is having its biggest year. The paint industry can expect to pay more for castor oil. Heavy U. S. and Japanese buying of castor beans in Brazil is the reason. The U. S. Department of Agriculture has begun a series of programs designed to increase domestic production of drying oils. Pine rosin is now an important paint material. Employment of alkyd resins will be limited to the available supply of phthalic anhydride. Dry colors are seriously short because of the demands of defense production. Many manufacturers are replacing synthetic resins with natural resins. Shipments of natural gums are likely to continue. Titanium situation is critical. Zinc oxide production is being regulated by OPM and shipments of lithopone and zinc sulfide pigments will be affected.

American Chemical Society Directors Take Action on Subject of Unionization

(*Continued from Page 460*)

of starting salaries for chemical internes and professionals under present economic conditions, when such persons are employed to do professional work:

A minimum starting salary not less than $1500 per annum for any chemical interne; and one of not less than $1800 per annum for any chemical interne; of better than average ability or training, including especially those graduated from institutions whose chemical work is of particularly high quality such as those approved by the American Chemical Society; and a minimum starting salary of not less than $2400 per annum for any individual who has attained "professional" grade as hereinbefore described, and, according to the extent of training and capacity, higher starting salary in proportion to training, experience, merit and individual accomplishment.

The foregoing suggestions are for minimum starting salaries only and are not to be regarded as suggestions for maximum salaries or as recommendations for a wage scale. They are made in respect of only those who are engaged for professional work in the field of chemistry and chemical engineering, as the Society cannot concern itself with problems of employment in other fields.

Inasmuch as technicians normally come under nonprofessional status, the technician grade does not come within the purview of this organization.

The Board of Directors recommends to employer and employe alike personal contact and careful consideration before concluding financial arrangements. Also it respectfully reminds both employers and members of this organization that the Employment Clearing House held at the semiannual meetings of the Society affords special facilities for consultation.

The Committee on Economic Status will give its immediate consideration to the whole question of employment in professional work in the field of chemistry.

Heavy Chemicals, Coal-Tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

PRICES CURRENT

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.*

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1940 Average $1.20 - Jan. 1941 $1.16 - Sept. 1941 $1.02

	Current Market		1941		1940	
			Low	High	Low	High
Acetaldehyde, drs, c-l, wks lb.	...	.11	...	.11	...	.11
Acetaldol, 55 gal drs wks lb. wks lb.	.12	.13	.11	.13	.11	.25
Acetamide, tech, lcl, kgs lb.	.28	.30	.28	.30	.28	.50
Acetanilid, tech, 150 lb bbls lb.	.29	.31	.29	.31	.27	.31
Acetic Anhydride, drs, f.o.b. wks, frt all'd lb.	.11½	.13	.10½	.13	.10½	.11½
Acetin, tech, drs lb.	...	.33	...	.33	...	.33
Acetone, tks, f.o.b. wks, frt all'd lb.	...	.07	.06	.07	.05	.06
drs, c-l, f.o.b. wks, frt all'd lb.	...	.08½	.07½	.08½	.06½	.07½
Acetyl chloride, 100 lb cbys lb	.08½	.09½	.07½	.09½	.06½	.07½
Acetic, 28%, 400 lb bbls, c-l, wks (*PC*) 100 lbs.	3.18	3.43	2.23	3.43	...	2.23
glacial, bbls, c-l, wks 100 lbs.	8.30	8.55	7.62	8.55	...	7.62
glacial, USP bbls, c-l, wks 100 lbs.	10.25	11.00	10.25	11.00	...	10.25
Acetic Acid Glacial, *Synthetic*						
99.5%, cbys, cases, delv lb.	.0918	.10	.0843	.10	...	...
99.5%, 110-gal dr, delv lb.	.0843	.0868	.0843	.0918	...	...
USP XI, cases, cbys, delv lb.	...	.11	.1025	.11	...	...
USP XI, 110-gal drs, delv lb.	...	.10½	.10¼	.11	...	...
CP, cases, cbys, delv lb.	...	.14	.13½	.14	...	...
CP, 55-gal drs, delv lb.	...	.13½	.13¼	.13½	...	...
Acetylsalicylic, USP, 225 lb. bbls lb.	...	.45	...	.45	...	.45
Adipic, kgs, bbls lb.	...	.31	...	.31	.31	.72
Anthranilic, ref'd, bbls lb.	1.15	1.20	1.15	1.20	1.15	1.20
tech bbls lb.	...	.75	...	.75	...	.75
Ascorbic, bot oz.	1.85	2.10	1.85	2.10	2.25	3.00
Battery, cbys, wks 100 lbs.	1.60	2.55	1.60	2.55	1.60	2.55
Benzoic, tech, 100 lb kgs lb.	.43	.47	.43	.47	.43	.47
USP, 100 lb kgs lb.	.54	.60	.54	.60	.54	.59
Boric, tech, gran, 80 tons, bulk-bgs, delv ton *a*	93.50	96.00	93.50	96.00	...	96.00
Broenner's, bbls lb.	...	1.11	...	1.11	...	1.11
Butyric, edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs, wks lb.	...	.22	...	.22	...	.22
wks, lcl lb.	...	.23	...	.23	...	.23
tks, wks lb.	...	.21	...	.21	...	.21
Caproic, normal, drs lb.	.25	.30	.25	.35	.35	.40
Chicago, bbls lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs. wks lb.	.03½	...	.03½	.05	.03½	.05
Chromic, 99¾%, drs (*FP*) lb.	.16¼	...	.15¼	.17¼	.15¼	.17¼
Citric, USP, crys, 230 lb bbls. lb. *b*	.20	.21	.20	.21	.20	.21½
anhyd, gran bbls lb. *b*	...	.23	...	.23	...	.23
Cleve's, 250 lb bbls lb.	...	.65	...	.65	...	.57
Cresylic, 50%, 210-215° C.L., HB. drs, wks, frt equal gal.	...	.76	...	...	...	...
50%, 204-206° C.L., LB, drs, wks, frt equal gal.	...	.76	...	...	...	...
Crotonic, bbls, delv lb.	.26	.50	.21	.50	.21	.50
Formic, tech, 140 lb drs lb.	.10½	.11½	.10½	.11½	.10½	.11½
Fumaric, bbls lb.	.27	.28	.24	.28	.24	.75
Fuming, see Sulfuric (Oleum)						
Gallic, tech, bbls lb.	1.05	1.08	.90	1.08	.75	.93
USP, bbls lh.	1.07	1.10	...	1.10	.92	.95
H, 225 lb bbls, wks lb.		45	...	.45	...	.45
Hydriodic, USP 47% lb.	2.42	2.44	2.42	2.44	2.30	2.42
Hydrobromic, 34% conct 155 lb cbys, wks lb.	.35	...	.35	...	.35	.44
Hydrochloric, see muriatic						
Hydrofluoric, 30%, 400 lb bbls, wks lb.	.06	.06½	.06	.06½	.06	.06½
Hydrofluosilicic, 35%, 400 bbls, wks lb.	.09	.09¼	.09	.09¼	.09	.09½
Lactic, 22%, dark, 500 lb bbls lb.	.02½	.03¾	.02½	.03¾	.02½	.03¾
22%, light ref'd, bbls lb.	.03½	.04¾	.03½	.04¾	.03½	.04¾
44%, light, 500 lb bbls lb.	.06½	.07¼	.06½	.07¼	.06½	.07¾
44%, dark, 500 lb bbls lb.	.05½	.06¼	.05½	.06¼	.05½	.06¼
50%, water white, 500 lb bbls lb.	.10½	.11½	.10½	.11½	.10½	.11½
Lauric, drs lb.	.18¼	.18¾	.15	.18¾	.12	.14½
Laurent's, 250 lb bbls lb.	...	.45	...	.45	.45	.46
Maleic, powd, kgs lb.	...	.30	...	.30	.30	.40
Malic, powd, kgs lb.	...	.47	...	.47	...	.47
Mixed, tks, wks N unit	.05	.06	.05	.06	.05	.07¼
S unit	.0085	.009	.0085	.009	.008	.009
Monochloracetic, tech, bbls lb.	.15	.18	.15	.18	.15	.18
Monosulfonic, bbls lb.	...	1.50	...	1.50	1.50	1.60

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls; *y* Price given is per gal.

(*FP*) Under full priority control. (*PC*) Under price ceiling.

	Current Market		1941		1940	
			Low	High	Low	High
Muriatic, 18°, 120 lb cbys, c-l, wks 100 lb.	...	1.50	...	1.50	...	1.50
tks, wks 100 lb.	...	1.05	...	1.05	1.00	1.05
20°, cbys, c-l, wks 100 lb.	...	1.75	...	1.75	...	1.75
tks, wks 100 lb.	...	1.15	...	1.15	1.10	1.15
22°, c-l, cbys, wks 100 lb.	...	2.25	...	2.25	...	2.25
tks, wks 100 lb.	...	1.65	...	1.65	1.60	1.65
CP, cbys lb.	.06½	.08	.06½	.08	.06½	.08
N & W, 250 lb bbls lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs lb.	.10	nom.	.10	nom.	nom.	.14
Naphthionic, tech, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks 100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks 100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks 100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv lb.	.11½	.13	.11½	.13	.11½	.13
Oxalic, 300 lb bbls, wks, or N Y lb.	.11¼	.14½	.10¾	.14½	.10¾	.12
Phosphoric, 85%, USP, cbys lb.	...	.12	...	.12	.12	.14
50%, acid, c-l, drs, wks lb.	...	.10½	.10½	.12	.06	.12
75%, acid, c-l, drs, wks lb.	.0725	.0850	.07½	.0850	...	.07½
Picric, kgs, wks lb.	...	.35	...	.35	.35	.40
Propionic, 98% wks, drs lb.	...	.25	...	.25	...	.25
80% lb.	...	.14	...	.14	.14	.20
Pyrogallic, tech, lump, pwd, bbls lb.	...	1.35	1.20	1.35	1.05	1.20
cryst, USP lb.	...	2.00	1.70	2.25	1.55	2.25
Ricinoleic, bbls lb.	.32	.37	.32	.37	.27	.33
Salicylic, tech, 125 lb bbls, wks lb.	...	.33	...	.33	...	.33
USP, bbls lb.	.35	.38	.35	.40	.35	.40
Succinic, bbls lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	...	.17	...	.17	.17	.18
Sulfuric, 60°, tks, wks ton	...	13.00	...	13.00	...	13.00
c-l, cbys, wks 100 lb.	...	1.25	...	1.25	...	1.25
66°, tks, wks ton	...	16.50	...	16.50	...	16.50
c-l, cbys, wks 100 lb.	...	1.50	...	1.50	...	1.50
CP, cbys, wks lb.	.06½	.08	.06½	.08	.06½	.08
Fuming (Oleum) 20% tks, wks ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls lb.	.66	.68	.54	.68	.44	.56
Tartaric, USP, gran, powd, 300 lb bbls lb.	...	.70½	.46¼	.70½	.35¼	.46¼
Tobias, 250 lb bbls lb.	.55	.60	.55	.60	.55	.60
Trichloroacetic bottles lb.	2.00	2.50	2.00	2.50	2.00	2.50
kgs lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls lb.	no prices		no prices		no prices	
Albumen, light flake, 225 lb. bbls lb.	.65	.75	.55	.75	.55	.62
dark, bbls lb.	.13	.15	.13	.18	.13	.18
egg, edible lb.	1.70	1.75	.65	1.75	.53	.65
Alcohol, Amyl (from Pentane) tks, delv lb.	...	.121	.111	.121	...	.111
c-l, drs, delv lb.	...	.131	.121	.131	...	.121
lcl, drs, delv lb.	...	.141	.131	.141	...	.131
Amyl, normal l-c-l drs Wyandotte, Mich. lb.	...	.27	.25	.27	...	.25
secondary, tks, delv lb.						
drs, c-l, delv E of Rockies lb.	...	.09½	...	.09½	...	.09½
tertiary, rfd, l-c-l, drs, f.o.b., Wyandotte, frt all'd lb.	...	.09	...	.09	...	.09
Benzyl, cans lb.	.65	.75	.65	.75	.68	1.00
Butyl, normal, tks, f.o.b. wks, frt all'd lb. *d*	...	.10	.09	.10	...	.09
c-l, drs, f.o.b. wks, frt all'd lb. *d*	...	.11	.10	.11	...	.10
Butyl, secondary, tks, delv lb. *d*	...	.08	.07¼	.08	...	.07¼
c-l, drs, delv lb. *d*	...	.09	.08¼	.09	...	.08¼
Butyl, tert denat cl drs lb.	...	.12½	...	.12½	...	...
lcl drs lb.	...	.13	...	.13	...	...
tks lb.	...	.11½	...	.11½	...	...
Capryl, drs, tech, wks lb.	...	.85	...	.85	...	.85
Cinnamic, bottles lb.	3.00	3.60	2.33	3.60	2.00	2.50
Denatured, CD, 14, c-l drs, wks (*PC, FP*) gal. *e*	...	.38½	.36½	.38½	.32½	.36½
tks, East, wks gal.	...	.32½	...	.26½	.25½	.26½
Western schedule, c-l, drs, wks gal. *e*	...	.43½	.40½	.43½	.34½	.37½
Denatured, SD, No. 1, tks,	...	.27½	...	.28½	.23½	.24½

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher: *e* Anhydrous is 5c higher in each case.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

Prices Current

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Alcohols (continued):						
Diacetone, pure, c-l drs, delv ....lb. *f*	.11½	.13	.09½	.13	...	.12
tech, contract, drs, c-l, delv ....lb.	.11	.12	.09	.12	...	.11½
Ethyl, 190 proof, molasses, tks ....gal. *g*	...	...	5.96½	7.86½	5.93½	5.94½
c-l, drs ....gal. *g*	...	7.92½	6.02½	7.92½	5.92½	6.00½
c-l, bbls ....gal. *g*	...	7.94½	6.03½	7.94½	6.00½	6.01½
Furfuryl, tech, 500 lb drs lb.	.20	.25	.20	.25	.25	.35
Hexyl, secondary tks, delv lb.	...	.12	...	.12	...	.12
c-l, drs, delv ....lb.	...	.13	...	.13	...	.13
Normal, drs, wks ....lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks lb.	...	.32	...	.32	...	.32
drs, lcl, delv ....lb.	...	.27	...	.27	...	.27
Isobutyl, ref'd, lcl, drs ..lb.	...	.086	.079	.086	...	.079
c-l, drs ....lb.	...	.076	.069	.076	...	.069
tks ....lb.	...	.076	.069	.076	...	.069
Isopropyl, ref'd, 91%, c-l, drs, f.o.b. wks, frt all'd ....lb.	...	.66½	...	.66½	...	.65
Ref'd 98%, drs, f.o.b. wks, frt all'd ....gal.	...	.65	...	.65	...	.65
Tech 91%, drs, above terms ....gal.	.35	.40	.35	.40	...	.33½
tks, same terms ....gal.	...	.30	...	.30	...	.28½
Tech 98%, drs, above terms ....gal.	...	.44	...	.44	.36	.37½
tks, above terms ...gal.	...	.37½	...	.37½	.31	.32½
Spec. Solvent, tks, wks gal.	...	.28	...	.28	.23½	.25½
Aldehyde ammonia, 100 gal drs ....lb.	.65	.70	.65	.70	.65	.82
Aldehyde Bisulfite, bbls, delv ....lb.	...	.17	...	.17	...	.17
Aldol, 95%, 55 and 110 gal, drs, delv ....lb.	.12	.15	.11	.15	.11	.12
Alphanaphthol, crude, 300 lb. bbls ....lb.	...	.52	...	.52	...	.52
Alphanaphthylamine, 350 lb bbls ....lb.	...	.32	...	.32	.32	.34
Alum, ammonia, lump, c-l, bbls, wks ....100 lb.	...	4.25	3.75	4.25	...	3.75
delv NY, Phila ...100 lb.	...	4.25	3.75	4.25	...	3.75
Granular, c-l, bbls wks ....100 lb.	...	4.00	3.50	4.00	...	3.50
Powd, c-l, bbls, wks 100 lb.	...	4.40	3.90	4.40	...	3.90
Potash, lump, c-l, bbls, wks ....100 lb.	...	4.50	4.00	4.50	...	4.00
Granular, c-l, bbls, wks ....100 lb.	...	4.25	3.75	4.25	...	3.75
Powd, c-l, bbls, wks 100 lb.	...	4.65	4.15	4.65	...	4.15
Soda, bbls, wks ....100 lb.	...	3.25	...	3.25	...	3.25
Chrome, bbls ....100 lb.	no prices		no prices		6.50	6.75
Aluminum metal, c-l, NY 100 lb.	17.00	18.00	17.00	18.00	18.00	20.00
Acetate, 20%, bbls ....lb.	.08½	.09	.08	.09	.07½	.09
Basic powd, bbls, delv lb.	.40	.50	.35	.50	.35	.50
24% basic, bbls, delv lb.	.09½	.10	.09½	.12	...	...
Insoluble basic powder, bbls, delv ....lb.	.40	.50	.35	.50	...	...
Chloride anhyd 99% wks lb.	.08	.12	.08	.12	.08	.12
93%, wks ....lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks lb.	.06	.06½	.06	.06½	.06	.06½
Solution, drs, wks ...lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03¼
Formate, 30% sol bbls, c-l, delv ....lb.	.13	.15	.13	.15	...	.13
Hydrate, 96%, light, 90 lb. bbls, delv ....lb.	...	.14½	.12½	.14½	.12½	.13½
heavy, bbls, wks ....lb.	...	.034	.029	.03½	.029	.03½
Oleate, drs ....lb.	.17½	.20	.17½	.20	.16¾	.20
Palmitate, bbls ....lb.	.20½	.21½	.20½	.21½	.20½	.24½
Resinate, pp., bbls ....lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls ....lb.	...	.23	.18	.23	.19	.20
Sulfate, com, c-l, bgs, wks ....100 lb.	...	1.15	...	1.15	...	1.15
c-l, bbls, wks ....100 lb.	...	1.35	...	1.35	...	1.35
Sulfate, iron-free, c-l, bags, wks ....100 lb.	...	1.85	1.60	1.85	1.60	1.80
c-l, bbls, wks ....100 lb.	...	2.05	1.80	2.05	1.65	1.80
Aminoazobenzene, 110 lb kgs lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd fert com, tks lb.	...	.05	.04½	.05	.04½	.05
Ammonia anhyd, 100 lb cyl lb.	...	.16	...	.16	...	.16
50 lb cyl ....lb.	...	.22	...	.22	...	.22
26°, 800 lb drs, delv ...lb.	.02¼	.02½	.02¼	.02½	.02¼	.02½
Aqua 26°, tks, NH_3 ..cont.	.	.05¼ z	.04	.05¼ z	.04	.05¼
Ammonium Acetate, kgs ..lb.	.27	.33	.27	.33	.27	.33
Bicarbonate, bbls, f.o.b. wks ....100 lb.	.0564	.0614	.0564	.0614	...	.0564
Bifluoride, 300 lb bbls ..lb.	.15½	.18	.14	.18	.14½	.16½
Carbonate, tech, 500 lb bbls ....lb.	.08¼	.09¼	.08¼	.09¼	.08¼	.11
Chloride, White, 100 lb bbls, wks ....100 lb.	4.45	..	4.45	...	4.45	4.90
Gray, 250 lb bbls, wks ....100 lb.	5.50	5.75	5.50	5.75	5.50	6.25
Lump, 500 lb cks spot lb.	no prices		no prices		no prices	
Lactate, 500 lb bbls ....lb.	.15	.16	.15	.16	.15	.16
Laurate, bbls ....lb.	...	.23	...	.23	...	.23
Linoleate, 80% anhyd, bbls ....lb.	...	.12	...	.12	...	.12
Naphthenate, bbls ....lb.	...	.17	...	.17	...	.17
Nitrate, tech, bbls ....lb.	.0435	.0455	.0435	.0455	...	.0455
Oleate, drs ....lb.	...	.14	...	.14	...	.14
Oxalate, neut, cryst, powd, bbls ....lb.	.23	.29	.19	.29	.19	.25
Perchlorate, kgs ....lb.	no stocks		no stocks		no stocks	
Persulfate, 112 lb kgs ..lb.	.21	.23	.21	.22	.21	.22

f Prices are 1c higher in each case.
g Grain alcohol 25c a gal. higher in each case. ** On a delv. basis.
z On a f.o.b. wks. basis.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Ammonium (continued):						
Phosphate, diabasic tech, powd, 325 lb bbls ....lb.	.07¼	...	.07¼	.09¼	.07¼	.10
Ricinoleate, bbls ....lb.	...	.15	...	.15	...	.15
Stearate, anhyd, bbls...lb.	...	.24½	...	.24½	...	.24½
Paste, bbls ....lb.	...	.06½	...	.06½	...	.06½
Sulfate, dom, f.o.b., bulk ton	29.00	30.00	29.00	30.00	...	29.00
Sulfocyanide, pure, kgs..lb.	...	.65	...	.65	...	.65
Amyl Acetate (from pentane)						
tks, delv ....lb.	...	.125	.105	.125	...	.105
c-l, drs, delv ....lb.	...	.135	.115	.135	...	.115
lcl, drs, delv ....lb.	...	.145	.125	.145	...	.125
tech drs, delv ....lb.	...	.11½	.11½	.12	...	.12
Secondary, tks, delv..lb.	...	.08½	...	.08½	...	.08½
c-l, drs, delv ....lb.	...	.09½	...	.09½	...	.09½
tks, delv ....lb.	...	.08½	...	.08½	...	.08½
Chloride, norm, drs, wks lb.	.56	.68	.56	.68	.56	.68
mixed l c l drs, wks lb.	...	.07	.0565	.07	.0535	.0665
tks, wks ....lb.	...	.05	.0465	.05	...	.0465
Mercaptan, drs, wks ...lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs...lb.	...	.25	...	.25	...	.25
Stearate, lcl, wks, drs..lb.	...	.26	...	.26	...	.26
Amylene, drs, wks ....lb.	.102	.11	.102	.11	.102	.11
tks, wks ....lb.	...	.09	...	.09	...	.09
Amylnaphthalenes, see Mixed Amylnaphthalenes						
Aniline Oil, 960 lb drs and tks ....lb.	...	.14½	...	.14½	...	.14½
Annatto fine ....lb.	.34	.39	.34	.39	.34	.39
Anthracene, 80-85% ....lb.	...	.55	...	.55	...	.55
Anthraquinone, sublimed, 125 lb bbls ....lb.	...	.70	.65	.70	...	.65
Antimony metal slabs, ton lots ....lb.	.14	nom.	.14	.16½	...	.14
Butter of, see Chloride						
Chloride, soln, cbys ....lb.	...	.17	..	.17	...	.17
Needle, powd, bbls ....lb.	.17	.18	.16	.18	.16	.22
Oxide, 500 lb bbls ....lb.	.14½	.16½	.12	.16½	.13	.15¾
Salt, 63% to 65%, drs lb.	...	.33	.28	.33	.28	nom.
Archil, conc, 600 lb bbls lb.	no prices		no prices		no prices	
Double, 600 lb bbls ...lb.	no prices		no prices		no prices	
Aroclors, wks ....lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbls ....lb.	.10	.10½	.09½	.10½	.09	.10
Arsenic, Metal ....lb.	no prices		no prices		...	...
Red, 224 lb cs kgs ...lb.	no prices		no prices		.17½	.18
White, 112 lb kgs ....lb.	.04	.04¾	.03½	.04¾	.03	.04¼
Barium Carbonate precip, 200 lb bgs, wks ....ton	55.00	65.00	45.00	65.00	45.00	62.50
Nat (witherite) 90% gr, c-l, wks, bgs ....ton	...	43.00	...	43.00	43.00	47.00
Chlorate, 112 lb kgs, NY lb.	no prices		...	.45	.20	.45
Chloride, 600 lb bbls, delv, zone 1 ....ton	77.00	92.00	77.00	92.00	77.00	92.00
Dioxide, 88%, 690 lb drs lb.	...	.10	...	.10	.10	.12
Hydrate, 500 lb bbls ...lb.	.06	.07	.05½	.07	.05½	.07
Nitrate, bbls ....lb.	...	.10½	.08½	.10½	.09½	.10½
Barytes, floated, 350 lb bbls c-l, wks ....ton	...	25.15	...	25.15	...	25.15
Bauxite, bulk, mines ....ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, 325 mesh, bgs, wks ....ton	...	16.00	...	16.00	...	16.00
200 mesh ....ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb. drs, wks ....lb.	.45	.55	.45	.55	.55	.60
Benzene (Benzol), 90%, Ind. 8000 gal tks, ft all'd gal.	...	.14	...	.14	.14	.16
90% c-l, drs ....gal.	...	.19	...	.19	.19	.21
Ind pure, tks, frt all'd gal.	...	.14	...	.14	.14	.16
Benzidine Base, dry, 250 lb. bbls ....lb.	...	.70	...	.70	...	.70
Benzoyl Chloride, 500 lb drs lb.	.23	.28	.23	.28	.23	.28
Benzyl Chloride, 95-97% rfd, drs ....lb.	.22	.24	.19	.24	.19	.21
Beta-Naphthol, 250 lb bbls, wks ....lb.	.23	.24	.23	.24	.23	.24
Naphthylamine, sublimed, 200 lb bbls ....lb.	1.25	...	1.25	1.35	1.25	1.35
Tech, 200 lb bbls ....lb.	.51	...	.51	.52	.51	.52
Bismuth metal ....lb.	...	1.25	...	1.25	...	1.25
Chloride, boxes ....lb.	...	3.00	3.00	3.25	3.20	3.25
Hydroxide, boxes ....lb.	3.35	3.46	3.35	3.46	3.35	3.46
Oxychloride, boxes ....lb.	3.10	3.19	3.10	3.19	...	3.10
Subbenzoate, boxes ....lb.	...	3.40	...	3.40	3.25	3.36
Subcarbonate, kgs ....lb.	1.73	1.85	1.73	1.85	1.73	1.76
Subnitrate, fibre, drs ...lb.	1.20	1.57	1.20	1.57	1.48	1.51
Trioxide, powd, boxes . lb.	...	3.65	...	3.65	3.56	3.57
Blanc Fixe, Pulp, 400 lb. bbls, wks ....ton *h*	40.00	46.50	35.00	46.50	50.00	80.00
Bleaching Powder, 800 lb drs, c-l, wks, contract 100 lb.	2.00	2.85	2.00	2.85	...	2.85
lcl, drs, wks ....lb.	2.25	3.35	2.25	3.35	2.25	3.35
Blood, dried, f.o.b., NY unit	...	4.25	2.40	4.25	2.25	3.35
Chicago, high grade ..unit	...	4.75	2.50	4.75	2.00	3.50
Imported shipt ....unit	...	4.15	2.45	4.15	2.25	3.30
Blues, Bronze Chinese						
Prussian Soluble ....lb.	...	.36	.33	.36	.33	.37
Milori, bbls ....lb.	...	.36	.33	.36	.33	.34
Ultramarine,* dry, wks, bbls ....lb.	...	.11	...	.11	...	.11
Regular grade, group 1 lb.	.16	.27	.16	.20	...	.16
Pulp, Cobalt grade ...lb.	.22	.24	.22	.24	.22	.27
Bone, 4½ + 50% raw, Chicago ....ton	39.00	40.00	30.00	40.00	30.00	33.00
Bone Ash, 100 lb kgs ....lb.	.06	.07	.06	.07	.06	.07
Meal, 3% & 50%, imp ton	...	37.00	31.50	37.00	31.50	32.50
Domestic, bgs, Chicago ton	34.00	35.00	32.00	35.00	29.00	32.00

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; *Freight is equalized in each case with nearest producing point.

Prices

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Borax, tech, gran, 80 ton lots,						
sacks, delv ....ton *i*	...	43.00	...	43.00	...	43.00
bbls, delv ....ton *i*	...	53.00	...	53.00	...	53.00
Tech, powd, 80 ton lots,						
sacks ....ton	...	48.00	...	48.00	47.00	48.00
bbls, delv ....ton	...	58.00	...	58.00	57.00	58.00
Bordeaux Mixture, drs ...lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases ....lb.	.25	.30	.25	.30	.25	.43
Bronze, Al, pwd, 300 lb drs lb.	...	.57	...	.57	...	.57
Gold, blk ....lb.	.60	.65	.60	.65	.60	.65
Butanes, com 16-32° group 3 tks ....lb.	.02½	.03	.02½	.03	.02¼	.03¾
Butyl, acetate, norm drs, frt all'd ....lb.	.11	.12	.10	.12	...	.10
tks, frt all'd ....lb	.10	.11	.09	.11	...	.09
Secondary, tks, frt all'd lb.	...	.08	.07¼	.08	...	.08
drs, frt all'd ....lb.	...	.09	.08¾	.09½	.07½	.08
Aldehyde, 50 gal drs, wks ....lb.	.15½	.17½	.15½	.17½	.15½	.17½
Carbinol, norm (see Normal Amyl Alcohol)						
Crotonate, norm, 55 and 110 gal drs, delv .....lb.	...	.35	...	.35	...	.35
Lactate ....lb.	...	.23½	...	.23½	.23½	.24½
Oleate, drs, frt all'd ...lb.	...	.25	...	.25	...	.25
Propionate, drs ....lb.	.16½	.17	.16½	.17	.16½	.17
tks, delv ....lb.	...	.15½	..	.15½	...	.15½
Stearate, 50 gal drs ....lb.	...	.32½	.28½	.32½	...	.28½
Tartrate, drs ....lb.	no prices		.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks lb.	...	.35½	...	.35½	...	.35½
Cadmium Metal ....lb.	.95	nom.	.80	.95	.80	.85
Sulfide, orange, boxes ..lb.	...	1.10	...	1.10	.75	.85
Calcium, Acetate, 150 lb bgs c-l, delv ....100 lb.	3.00	4.00	1.90	4.00	...	1.90
Arsenate, c-l, E of Rockies, dealers, drs ....lb.	.06½	.07½	.06	.07½	.06	.07¼
Carbide, drs ....lb.	...	.04¾	...	.04¾	.05	.06
Carbonate, tech, 100 lb bgs, c-l ....ton	16.00	20.00	16.00	20.00	...	...
Chloride, flake, 375 lb drs, burlap bgs, c-l, delv..ton	...	20.50	...	20.50	...	22.00
paper bags, c-l, delv ton	20.50	35.00	20.50	35.00	20.50	36.00
Solid, 650 lb drs, c-l, delv ....ton	19.00	33.00	19.00	33.00	19.00	35.00
Ferrocyanide, 350 lb bbls wks ....lb.	...	.20	...	.20	...	.20
Gluconate, Pharm, 125 lb bbls ....lb.	.50	...	.50	.57	.50	.57
Levulinate, less than 25 bbl lots, wks ....lb.	...	3.00	...	3.00	...	3.00
Nitrate, 100 lb bags ...ton	no prices		no prices		28.00	29.00
Palmitate, bbls ....lb.	.22	.24	.22	.24	.22	.24
Phosphate, tribasic, tech, 450 lb bbls ....lb.	.0635	.0705	.0635	.0705	.0635	.07½
Resinate, precip, bbls ..lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls ...lb.	.26	.27	.20½	.27	.20½	.22½
Camphor, slabs ....lb.	1.10	nom.	.73	1.15	.82	.84
Powder ....lb.	.63	.78	.63	.83	.82	.84
Carbon Bisulfide, 500 lb drs lb.	...	.05½	.05	.05¾	.05	.05¾
Black, c-l, bgs, f.o.b. plants ....lb.	...	.03425	.03325	.03425	.02¾	.03¾
lcl, bgs, f.o.b. whse ..lb.	...	.075	.07025	.075	...	.06525
Decolorizing, drs, c-l ..lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 55 or 110 gal drs, c-l, delv ....lb.	...	.73	.66½	.73	...	.66½
Casein, Standard, Dom, grd lb.	.28	.29	.11½	.29	.10	.14½
80-100 mesh, c-l bgs ...lb.	.28½	.29½	.12	.29½	.11	.15
Castor Pomace, 5½ NH_3, c-l, bgs, wks ....ton	15.50	16.00	15.00	16.00	15.00	17.50
Imported, ship, bgs ....ton	no prices		no prices		...	20.00
Celluloid, Scraps, ivory cs lb.	.12	.15	.12	.15	.12	.15
Transparent, cs ....lb.	...	.20	..	.20	...	.20
Cellulose, Acetate, frt all'd, 50 lb kgs ....lb.	...	.30	...	.30	.30	.34
Triacetate, flake, frt all'd ....lb.	...	.30	...	.30	...	...
Chalk, dropped, 175 lb bbls lb.	...	.02⅞	.02¾	.02⅞	.02¾	.03¾
Precip, heavy, 560 lb cks lb.	...	.03¼	...	.03¼	.02¾	.03¼
Light, 250 lb cks ......lb.	...	.03¼	...	.03¼	.03¼	.04
Charcoal, Hardwood, lump, blk, wks ....bu.	...	.15	...	.15	...	.15
Softwood, bgs, delv* ..ton	25.00	36.00	25.00	36.00	25.00	36.00
Willow, powd, 100 lb bbls, wks ....lb.	.06	.07	.06	.07	.06	.07
Chestnut, clarified tks, wks lb.	...	.0190	.01¾	.0190	...	.01¾
25%, bbls, wks ....lb.	...	.0240	...	.0240	...	.02½
China Clay, c-l, blk mines ton	...	7.60	...	7.60	7.60	9.50
Imported, lump, blk ...ton	18.60	23.00	18.60	...	25.00	26.00
Chlorine, cyls. lcl, wks, contract (*FP*) ....lb.	...	.07¼	...	.07¼	.07½	.08½
cyls, c-l, contract ...lb *j*	...	.05¼	.	.05¼	...	.05¼
Liq. tk, wks, contract 100 lb.	...	2.00	1.75	2.00	...	1.75
Multi, c-l, cyls, wks, cont ....lb.	...	.235	.019	.235	...	.019
Chloroacetophenone, tins, wks ....lb.	3.00	3.50	3.00	3.50	3.00	3.50
Chlorobenzene, Mono, 100 lb. drs, lcl, wks ....lb.	...	.08	.06	.08	.06	.08
Chloroform, tech, 1000 lb drs ....lb.	...	.20	...	.20	.20	.21
USP, 25 lb tins ......lb.	...	.30	...	.30	.30	.31
Chloropicrin, comml cyls ..lb.	...	.80	...	.80	...	.80
Chrome, Green, CP ......lb.	.21	.25	.21	.25	.21	.25
Yellow ....lb.	...	.14½	.13½	.14½	.13½	.14½
Chromium Acetate, 8% Chrome, bbls ....lb.	no price		...	.05¾	...	.05¾

j A delivered price; * Depends upon point of delivery.
(*FP*) Full Priority.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Chromium (continued)						
Fluoride, powd, 400 lb bbl ... lb.	.27	.28	.27	.28	.27	.28
Coal tar, bbls ... bbl.	7.50	7.75	7.50	7.75	7.50	8.00
Cobalt Acetate, bbls ... lb.	...	.80½	...	.80½	...	.80½
Carbonate tech, bbls ... lb.	...	1.58	...	1.58	1.38	1.60
Hydrate, bbls ... lb.	...	1.98	...	1.98	...	1.78
Linoleate, solid, bbls ... lb.	...	.33	...	.33	...	.33
paste, 6%, drs ... lb.	...	.31	...	.31	...	.31
Oxide, black, bgs ... lb.	...	1.84	...	1 84	...	1.84
Resinate, fused, bbls ... lb.	...	.13½	...	13½	...	.13½
Precipitated, bbls ... lb.	...	.34	...	.34	...	.34
Cochineal. gray or bk bgs lb.	.37	.38	.37	.38	.37	.38
Teneriffe silver, bgs ... lb.	.38	.39	.38	.39	.38	.39
Copper, metal *FP, PC* . 100 lb.	12.00	12.50	12.00	12.50	11.00	12.00
Acetate, normal, bbls, dlvd ... lb.	.24	.26	.22	.26	.22	.24
Carbonate, 52-54% 400 lb bbls ... lb.	.18	.20½	.1650	.20½	.1570	.169
Chloride, 250 lb bbls ... lb.	...	.19½	.16	.19½	.16	.18
Cyanide, 100 lb drs ... lb.	.34	.38	.34	.38	...	.34
Oleate, precip, bbls ... lb.	.	.20	.	.20	. .	.20
Oxide, black, bbls, wks lb.	.19½	.21	.18	.21	.18	.18¾
red 100 lb bbls ... lb.	.20	.22	.19	.22	.19½	.20½
Sub-acetate verdigris, 400 lb bbls ... lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks, 100 lb.	5.00	5.50	4.75	5.50	4.45	4.75
Copperas crys and sugar bulk c-l, wks ... ton	...	17.00	14.00	17.00	14.00	20.00
Corn Sugar, tanners, bbls 100 lb.	...	4.05	3.36	4.05	2.99	3.39
Corn Syrup, 42°, bbls 100 lb.	...	3.52	3.42	3.52	3.02	3.47
43°, bbls ... 100 lb.	...	3.57	3.47	3.57	3.07	3.52
Cotton, Soluble, wet 100 lb. bbls ... lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, powd & gran 300 lb bbls ... lb.	...	.57½	.38¼	.57½	.28¼	.38¼
Creosote, USP 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1 tks ... gal.	.13½	.14½	.13½	.14½	.13½	.14
Grade 2 ... gal.	.122	.132	.122	.132	.122	.132
Cresol, USP, drs, c-l ... lb.	.10¼	.10¾	.09¾	.10¾	.09¾	.10¼
Crotonaldehyde, 97%, 55 and 110 gal drs, wks ... lb.	...	.15	.11	.15	.11	.12
Cutch, Philippine, 100 lb. bale lb.	...	.04¾	...	.04¾	.04	.04½
Cyanamid, pulv, bags, c-l, frt all'd, nitrogen basis, unit	no prices		...	1.40	...	1.40
Derris root 5% rotenone, bbls ... lb.	.28	.30	.21	.30	.21	.30
Dextrin, corn, 140 lb bgs f.o.b., Chicago ... 100 lb.	...	4.00	3.80	4.00	3.40	3.80
British Gum, bgs ... 100 lb.	...	4.25	4.05	4.25	3.65	4.10
Potato, Yellow, 220 lb bgs lb.	...	.08½	.08	.08½	...	.07¾
White, 220 lb bgs, lcl lb.	.08½	.09	.08½	.09	.08½	.09
Tapioca, 200 bgs, lcl ... lb.	...	.0715	...	.0715	...	.0715
White, 140 lb. bgs ... 100 lb.	...	3.95	3.75	3.95	3.35	3.75
Diamylamine, c-l, drs, wks lb.	...	.47	...	.47	...	.47
lcl drs, wks ... lb.	...	.50	.48	.50	...	.50
Diamylene, drs, wks ... lb.	.095	.102	.095	.102	.095	.102
tks, wks ... lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs ... lb.	.085	.092	.085	.092	.085	.092
tks, wks ... lb.	...	.075	...	.075	...	.075
Diamylnaphthalene, l-c-l, drs, f.o.b. wks, ... lb.	...	.17	.17	.20	...	...
Diamylphthalate, drs, wks lb.	.21	.21½	.21	.21½	.21	.21½
Diamyl Sulfide, drs, wks lb.	...	1.10	...	1.10	...	1.10
Diatomaceous Earth, see Kieselguhr.						
Dibutoxy Ethyl Phthalate, drs, wks ... lb.	...	.35	...	.35	...	.35
Dibutylamine, lcl, drs, wks lb.	...	.53	...	.53	...	.53
c-l drs, wks ... lb.	...	.50	...	.50	...	.50
tks, wks ... lb.	...	.48	...	.48	...	.48
Dibutyl Ether, drs, wks, lcl lb.	.26	.28	.25	.28	...	.25
Dibutylphthalate, drs, wks, frt all'd ... lb.	.19	.20	.19	.20	.19	.19½
Dibutyltartrate, 50 gal drs lb.	...	.50	...	.50	...	.50
Dichlorethylene, drs ... lb.	...	.25	...	.25	...	.25
Dichloroethylether, 50 gal drs, wks ... lb.	.15	.16	.15	.16	.15	.16
tks, wks ... lb.	...	.14	...	.14	...	.14
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, drs, wks lb.	...	.04	.025	.04	...	.025
tks, wks ... lb.	...	.025	.0221	.025	...	.0221
Diethanolamine, tks, wks ... lb.	...	.22½	...	.22½	...	.22½
Diethylamine, 300 lb drs, lcl, f.o.b., wks ... lb.	...	.70	...	.70	...	.70
Diethylamino Ethanol, l-c-l, drs, f.o.b. Wyandotte, frt all'd E. Miss. ... lb.	...	.75	...	.75	...	...
Diethylaniline, 850 lb drs lb.	...	.40	...	.40	.40	.52
Diethylcarbonate, com drs lb.	...	.25	...	.25	...	.25
Diethylorthotoluidin, drs ... lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate,, c-l, drs lb.	...	.20	.19	.20	.19	.19½
Diethylsulfate, tech, drs, wks, lcl ... lb.	.13	.14	.13	.14	.13	.14
Diethyleneglycol, drs ... lb.	.14	.15½	.14	.15½	.14½	.15½
Mono ethyl ether, drs ... lb.	.14½	.15½	.14½	.15½	.14½	.16
tks, wks ... lb.	...	.13½	...	.13½	.	.13½
Mono butyl ether, drs ... lb.	.22½	.24½	.22½	.24½	.22½	.24½
tks, wks ... lb.	...	.22	...	.22	...	.22
Diethylene oxide, 50 gal drs, wks ... lb.	.20	.24	.20	.24	.20	.24
Diglycol Laurate, bbls ... lb.	...	.16	...	.16	.16	.21
Oleate, bbls ... lb.	...	.17	...	.17	.13	.17
Stearate, bbls ... lb.	...	.22	...	.22	.22	.26
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis ... lb.	1.00	1.05	1.00	1.05	1.00	1.05
Dimethylaniline, 240 lb drs lb.	.23	.24	.23	.24	.23	.24

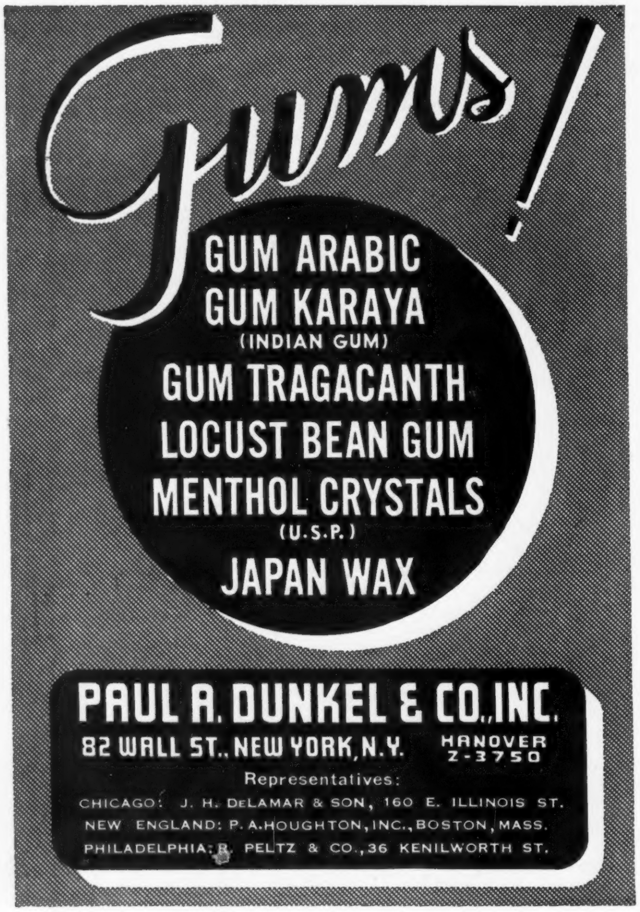
* These prices were on a delivered basis.
FP Full Priority. *PC* Price Control.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Dimethyl phthalate, drs, wks, frt all'd ....lb.	...	.20	.18½	.20	...	.18½
Dimethylsulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls lb.	...	.18	...	.18	.18	.19
Dinitrochlorobenzene, 400 lb bbls ....lb.	...	.14	...	.14	...	.14
Dinitronaphthalene, 350 lb bbls ....lb.	.35	.38	.35	.38	.35	.38
Dinitrophenol, 350 lb bbls lb.	...	.22	...	.22	.22	.23
Dinitrotoluene, 300 lb bbls lb.	...	.18	.15½	.18	...	.15½
Diphenyl, bbls ....lb.	.15	...	.15	.20	.15	.20
Diphenylamine ....lb.	...	.25	...	.25	.25	.32
Diphenylguanidine, 100 lb drs ....lb.	.35	.37	.35	.37	.35	.37
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt ton	.43	47.00	32.00	47.00	...	nom.
Extract ....lb.	.05¾	.06¾	.05¾	.06¾	.05¾	.06¾
Drymet (see sodium metasilicate anhydrous).						
Egg Yolk, dom., 200 lb. cases lb.	.92	.95	.60	.95	.57	.62
Epsom Salt, tech, 300 lb bbls c-l, NY .....100 lb.	...	1.90	...	1.90	1.90	2.10
USP, c-l, bbls .....100 lb.	...	2.10	...	2.10	...	2.10
Ether, USP anaesthesia 55 lb drs ....lb.	.52	.53	.26	.53	...	.26
Isopropyl 50 gal drs ...lb.	.07	.08	.07	.08	.07	.08
tks, frt all'd ....lb.	...	.06	...	.06	...	.06
Nitrous conc bottles ...lb.	...	.73	...	.73	...	.68
Synthetic, wks, tks .....lb.	...	.08	.08	.09	.08	.09
Ethyl Acetate, 85% Ester						
tks, frt all'd ....lb.	...	.07½	.06½	.07½	.06	.06½
drs, frt all'd ....lb.	...	.08½	.07½	.08½	.07	.08½
99%, tks, frt all'd ...lb.	...	.07¾	.06¾	.07¾	.06¼	.08
drs, frt all'd ....lb.	...	.08¾	.07¾	.08¾	.07¼	.08¾
Acetoacetate, 110 gal drs lb.	...	.29½	.27½	.29½	...	.27½
Benzylaniline, 300 lb drs lb.	.86	.88	.86	.88	.86	.88
Bromide, tech drs .....lb.	.50	.55	.50	.55	.50	.55
Cellulose, drs, wks, frt all'd ....lb.	.45	...	.45	.50	.45	.50
Chloride, 200 lb drs ....lb.	.18	.20	.18	.20	.18	.20
Chlorocarbonate, cbys ..lb.	...	.30	...	.30	...	.30
Crotonate, drs ....lb.	...	.35	...	.35	...	.35
Formate, drs, frt all'd ..lb.	.25	.26	.25	.26	.23	.24
Lactate, drs, wks ......lb.	...	.33½	...	.33½	...	.33½
Oxalate, drs, wks ......lb.	...	.25	...	.25	...	.25
Oxybutyrate, 50 gal drs, wks ....lb.	1.00	nom.	1.00	nom.	.30	1.00
Silicate, drs, wks ......lb.	...	.77	...	.77	...	.77
Ethylene Dibromide, 60 lb drs ....lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont ....lb.	.75	.85	.75	.85	.75	.85
Anhydrous ....lb.	...	.75	...	.75	..	.75
Dichloride, 50 gal drs, E. Rockies ....lb.	...	.0742	.0693	.0746	.0595	.0694
Glycol, 50 gal drs, wks..lb.	.14½	.18½	.14½	.18½	.14½	.18½
tks, wks ....lb.	...	.13½	...	.13½	...	.13½
Mono Butyl Ether, drs, wks ....lb.	.16½	.17½	.16½	.17½	.16½	.21
tks, wks ....lb.	...	.15½	...	.15½	...	.15½
Mono Ethyl Ether, drs wks ....lb.	.14½	.15½	.14½	.15½	.14½	.15½
tks, wks ....lb.	...	.13½	...	.13½	...	.13½
Mono Ethyl Ether Acetate, drs, wks .....lb.	.11½	.12½	.11½	.12½	.11½	.13
tks, wks ....lb.	...	.10½	...	.10½	...	.10½
Mono Methyl Ether, drs wks ....lb.	.15½	.16½	.15½	.16½	.15½	.17
tks, wks ....lb.	...	.14½	...	.14½	...	.14½
Oxide, cyl ....lb.	.50	.55	.50	.55	.50	.55
Ethylideneaniline ....lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery ....ton	17.00	19.00	17.00	19.00	17.00	19.00
Powd, blk wks ....ton	14.00	17.50	14.00	17.50	14.00	17.50
Ferric Chloride, tech, crys, 475 lb bbls ....lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys ....lb.	.06½	.07	.06½	.07	.06¼	.07
Fish Scrap, dried, unground wks ....unit *l*	...	4.85	4.35	4.85	3.10	4.25
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis ....unit *m*	...	3.25	2.75	3.25	2.25	3.50
Fluorspar, 98% bgs ....ton	...	32.00	29.00	32.00	29.00	32.00
Formaldehyde, c-l, bbls, wks (*FP, PC*) ....lb.	.055	.0575	...	...	...	...
Fossil Flour ....lb.	.02½	.04	.02½	.04¼	.02½	.04
Fullers Earth, blk, mines ton	...	15.00	...	15.00	...	15.00
Imp powd, c-l, bgs ....ton	no prices		no prices		...	25.00
Furfural (tech) drs, wks lb.	...	.15	.10	.15	.10	.15
tks, wks ....lb.	...	.09	...	.09	...	...
Furfuramide (tech) 100 lb drs ....lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.17½	.19½	.16	.19½	.16	.17½
Fustic, crystals, 100 lb boxes ....lb.	...	.28	.24	.28	.24	.28
Liquid 50°, 600 lb bbls lb.	...	.12½	.10½	.14	.10½	.14
Solid, 50 lb boxes ....lb.	.19	.21	.19	.21	.19	.21
G Salt paste, 360 lb bbls..lb.	...	.45	...	.45	.45	.47
Gambier, com 200 lb bgs..lb.	nom.	.09	.06½	.09	.06½	.07
Singapore cubes, 150 lb bgs ....100 lb.	.10½	.11	.08¼	.11	.08¼	.10
Glauber's Salt, tech, c-l, bgs, wks* ....100 lb.	1.05	1.28	.95	1.28	.95	1.18
Anhydrous, see Sodium Sulfate						
Glue, bone, com grades, c-l bgs ....lb.	.15½	.18	.13½	.18	.13½	.15½
Better grades, c-l, bgs lb.	.19	.30	.15	.30	.15	.23

***l* + 10; *m* + 50; * Bbls. are 20c higher.**
FP Full Priority. *PC* Price Ceiling.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Glycerin, CP, 550 lb drs lb.	...	.19½	.14½	.19½	...	.12½
Dynamite, 100 lb drs ...lb.	...	**nom.**	...	nom.	...	nom.
Saponification, drs .....lb.	.20½	nom.	.09½	.20½	.09½	.13
Soap Lye, drs ....lb.	.18	nom.	.07⅛	.13	.07⅛	.08¼
Glyceryl Bori-Borate, bbls lb.	...	.40	...	.40	...	.40
Monoricinoleate, bbls ...lb.	...	.27	...	.27	...	.27
Monostearate, bbls .....lb.	...	.30	...	.30	...	.30
Oleate, bbls ....lb.	...	.22	...	.22	...	.22
Phthalate ....lb.	...	.38	...	.38	.37	.38
Glyceryl Stearate, bbls ...lb.	...	.18	...	.18	...	.18
Glycol Bori-Borate, bbls ..lb.	...	.22	...	.22	...	.22
Phthalate, drs ....lb.	...	.38	...	.38	...	.38
Stearate, drs ....lb.	...	.26	...	.26	...	.26
GUMS						
Gum Aloes, Barbadoes ...lb.	.85	.90	.80	.95	.80	.90
Arabic, amber sorts ....lb.	.24	.25	.14	.25	.08½	.15
White sorts, No. 1, bgs lb.	.45	nom.	.35	.45	.28	.36
No. 2, bgs ....lb.	no prices		no prices		.27	.34
Powd, bbls ....lb.	.27	.30	.18	.30	.12½	.20
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b. NY ....lb.	.04½	.05½	04½	.05½	.02½	.10½
California, f.o.b. NY, drs ton	29.00	36.50	29.00	36.50	29.00	36.50
Egyptian, 200 lb cases, f.o.b. NY ....lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120 lb cases ....lb.	.24	.25	.19	.25	.17	.24
Copal, Congo, 112 lb bgs, clean, opaque ....lb.	...	.49½	...	.49½	...	.49½
Dark amber ....lb.	...	.12¾	...	.12¾	.11⅜	.12⅜
Light amber ....lb.	...	.17	...	.17	...	.17
Copal, East India, 180 lb bgs						
Macassar pale bold ... lb.	...	.15¾	.12¾	.15¾	.12¾	.15⅝
Chips ....lb.	...	.10¼	.06¾	.10¼	.06¾	.09
Dust ....lb.	...	.07	.05¼	.07	.04¾	.06¾
Nubs ....lb.	...	.12⅜	.10½	.12⅜	.10½	.14⅜
Singapore, Bold ....lb.	...	.22⅜	.15¾	.22⅜	.14⅝	.17½
Chips ....lb.	...	.12⅜	.08½	.12⅜	.08½	.09⅛
Dust ....lb.	...	.07	.05¼	.07	.04¾	.06¾
Nubs ....lb.	...	.17¾	.11	.17¾	.11	.13½
Copal Manila, 180-190 lb	...	.14	.13⅞	.14	.13¾	.16¾
Loba B ....lb.	...	.14¼	.11¾	.14¼	.11¾	.16⅛
Loba C ....lb.	...	.13⅞	.11¼	.13⅞	.11¼	.14½
DBB ....lb.	...	.12¼	.10	.12¼	.06⅞	.12¼
MA sorts ....lb.	...	.10¼	.07¾	.10¼	.07¾	.13¾
Copal Pontianak, 224 lb cases, bold genuine ..lb.	...	.22⅞	.15⅜	.22⅞	.15⅛	.18½
Chips ....lb.	...	.12⅞	.10	.12⅞	.08⅜	.10½
Mixed ....lb.	...	.17⅞	.14⅜	.17⅞	.14⅛	.16⅝
Nubs ....lb.	...	.18⅞	.12¾	.18⅞	.10¾	.13½
Split ....lb.	...	.19⅝	.13¾	.19⅝	.13½	.16⅛
Damar Batavia, 136 lb cases						
A ....lb.	...	.33¾	.21⅝	.33¾	.21⅝	.22¾
B ....lb.	...	.32½	.20¼	.32½	.20⅛	.21⅛
C ....lb.	...	.26¾	.14⅝	.26¾	.15⅝	.15¼
D ....lb.	...	.23⅝	.13¼	.23⅝	.13¼	.13¾
A/D ....lb.	...	.26⅜	.15¼	.26⅜	.13⅞	.14½
A/E ....lb.	...	.23⅝	.12⅞	.23⅝	.12⅞	.13⅜
E ....lb.	...	.16¾	.10	.16¾	.10	.10⅜
F ....lb.	...	.13	.08	.13	.08	.08¾
Singapore, No. 1 ......lb.	...	.28⅝	.16⅝	.28⅝	.16⅝	.19⅝
No. 2 ....lb.	...	.23½	.12¼	.23½	.12¼	.15¾
No. 3 ....lb.	...	.12⅜	.07⅛	.12⅜	.07⅛	.09
Chips ....lb.	...	.21½	.11	.21½	.11	.12½
Dust ....lb.	...	.12⅝	.07⅛	.12⅝	.07⅛	.09
Seeds ....lb.	...	.15¾	.09⅞	.15¾	.09⅞	.10½
Elemi, cns, c-l ....lb.	...	.08⅞	.08½	.08⅞	.10⅛	.11⅝
Ester ....lb.	.08½	.09½	.06¼	.09½	.06¼	.06¾
Gamboge, pipe, cases .....lb.	.95	1.00	.95	1.00	.70	.75
Powd, bbls ....lb.	1.05	1.10	1.05	1.10	.75	.80
Ghatti, sol, bgs ....lb.	.11	.15	.11	.15	.11	.15
Karaya, bbls, bxs, drs ...lb.	.14	.33	.14	.33	.14	.33
Kauri, NY						
Brown XXX, cases ....lb.	...	.60	...	.60	...	.60
BX ....lb.	...	.38	...	.38	...	.38
B1 ....lb.	...	.28	...	.28	...	.28
B2 ....lb.	...	.24	...	.24	...	.24
B3 ....lb.	...	.18½	...	.18½	...	.18½
Pale XXX ....lb.	...	.61	...	.61	...	.61
No. 1 ....lb.	...	.41	...	.41	...	.41
No. 2 ....lb.	...	.24	...	.24	...	.24
No. 3 ....lb.	...	.17¾	...	.17¾	...	.17¾
Kino, tins ....lb.	no prices		no prices		2.00	4.50
Mastic ....lb.	2.50	2.60	1.50	2.60	.85	2.50
Sandarac, prime quality, 200 lb bgs & 300 lb cks ..lb.	.88	.89	.50	.89	.35	.37
Senegal, picked bags .....lb.	...	.30	...	.30	...	.30
Sorts ....lb.	...	.13	...	.13	...	.13
Thus, bbls ....280 lbs.	...	16.50	15.00	16.50	15.00	15.25
Tragacanth, No. 1, cases ..lb.	3.25	3.40	2.75	3.40	2.65	3.50
No. 2 ....lb.	2.70	2.80	2.45	2.80	2.55	3.35
No. 3 ....lb.	1.10	1.20	1.10	2.60	2.45	2.90
Yacca, bgs ....lb.	.06½	.07¾	.03½	.07¾	.03½	.04
Hematine crystals, 400 lb bbls lb.	.24	.34	.20	.34	.20	.30
Hemlock, 25%, 600 lb bbls.						
wks ....lb.	...	.03½	.03⅛	.03½	.03⅛	.03⅜
tks ....lb.	...	.03	.02¾	.03	.02¾	.03
Hexalene, 50 gal drs, wks lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70° C. Group 3, tks ....gal.	...	.09¾	...	.09¾	...	.10½
Hexamethylenetetramine, powd, drs (*FP*) ......lb.	.32	.33	.32	.33	.32	.33
Hexyl Acetate, secondary, delv, drs ....lb.	.13	.13½	.13	.13½	.13	.13½
tks ....lb.	...	.12	..	.12	...	.12
Hoof Meal, f.o.b. Chicago unit	2.95	3.00	2.65	3.00	2.00	3.15
Hydrogen Peroxide, 100 vol, 140 lb cbys ....lb.	.16	.18½	.16	.18½	.16½	.20

(*FP*) Full Priority.



	Current Market		1941 Low	1941 High	1940 Low	1940 High
Hydroxylamine Hydrochloride ....lb.	...	3.15	...	3.15	...	3.15
Hypernic, Bags, No. 1 ....lb.	...	.42	.40	.42	...	...
Indigo, Bengal, bbls .....lb.	2.14	2.20	1.63	2.20	1.63	1.67
Synthetic, liquid ....lb.	.16½	.19	.16½	.19	.16½	.19
Iodine, Resublimed, jars..lb.	...	2.00	...	2.00	1.75	2.50
Irish Moss, ord, bales ....lb.	.25	.28	.25	.28	.15	.28
Bleached, prime, bales...lb.	.32	.35	.32	.35	.28	.35
Iron Acetate Liq. 17°, bbls delv ....lb.	.03½	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls..100 lb.	3.50	4.00	3.50	4.00	2.75	4.00
Isobutyl Carbinol (128-132° C)						
drs, frt all'd ....lb.	...	.23½	.22½	.23½	.22½	.34
tks, frt all'd ....lb.	...	.21½	...	.21½	.21½	.32
Isopropyl Acetate, tks, frt all'd ....lb.	...	.07½	.06½	.07½	.05½	.06½
drs, frt all'd, c-l .....lb.	...	.08½	.07½	.08½	.06½	.07½
Ether, see Ether, isopropyl.						
Keiselguhr, dom bags, c-l, Pacific Coast ....ton	22.00	25.00	22.00	25.00	22.00	35.00
Lead Acetate, f.o.b. NY, bbls,						
White, broken ....lb.	.12	.12½	.11	.12½	...	.11
cryst, bbls ....lb.	.12	.12½	.11	.12½	...	.11
gran bbls ....lb.	.12¾	.13¼	.11¾	.13¼	...	.11¾
powd, bbls ....lb.	.12¾	.13¼	.11¾	.13¼	...	.11¾
Arsenate, East, drs .....lb.	.09	.11	.09	.11	.08½	.11
Linoleate, solid, .bbls...lb.	...	.19	...	.19	...	.19
Metal, c-l, NY .....100 lb.	...	5.90	5.70	5.90	4.90	5.70
Nitrate, 500 lb bbls, wks lb.	.11	.14	.11	.14	.11	.14
Oleate, bbls ....lb.	.18½	.20	.18½	.20	.18½	.20
Red, dry, 95% Pb_3O_4, delv ....lb.	...	.08¾	.08	.08¾	.07½	.0815
97% Pb_3O_4, delv ....lb.	...	.086	.084	.086	.0765	.0848
98% Pb_3O_4, delv ....lb.	.0885	.0865	.0865	0885	.08	.0865
Resinate, precip, bbls...lb.	...	.16½	...	.16½	...	.16½
Stearate, bbls ....lb.	...	.25	...	.25	...	.26
Titanate, bbls, c-l, f.o.b. wks, frt all'd ....lb.	...	.10¼	...	.10¼	.10	.10¼
White, 500 lb bbls, wks, lb.	...	.07½	...	.07½	.07	.07½
Basic sulfate, 500 lb bbls, wks ....lb.	...	.07	.06½	.07	.06¼	.06½
Lime, chemical quicklime, f.o.b. wks, bulk .....ton	7.00	13.00	7.00	13.00	7.00	13.00
Hydrated, f.o.b. wks ...ton	8.50	16.00	8.50	16.00	8.50	16.00
Lime Salts, see Calcium Salts						
Lime, sulfur, dealers, tks gal.	.07½	.08½	...	.07½	.07½	.11½
drs ..... gal.	.1"	14	.10	.14	.11	.16
Linseed Meal, bgs ....ton	...	32.50	23.00	32.50	23.50	37.00
Litharge, coml, delv, bbls lb.	...	.0760	.07	.0760	.06½	.07½
Lithopone, dom, ordinary, delv, bgs ....lb.	...	.0385	...	.0385	...	.036
bbls ....lb.	...	.0410	...	.0410	.03¾	.03¾
Titanated, bgs ....lb.	...	.05¼	...	.05¼	...	.05¼
bbls ....lb.	...	.05½	...	.05½	...	.05½
Logwood, 51°, 600 lb bbls lb.	...	.13	.10½	.13	.10½	.12½
Solid, 50 lb boxes .....lb.	...	.22	.16½	.22	.16½	.20½
Madder, Dutch ....lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbls ton	72.00	80.00	65.00	80.00	58.00	70.00
Magnesium Carb, tech, 70 lb bgs, wks ....lb.	...	.06¼	...	.06¼	...	.06¼
Chloride flake, 375 lb bbls, c-l, wks ....ton	...	32.00	...	32.00	32.00	42.00
Oxide, calc tech, heavy bbls, frt all'd ......lb.	...	.26	...	.26	.25	.30
Light bbls above basis lb.	...	.26	...	.26	.20	.26
USP Heavy, bbls, above basis ....lb.	...	.26	...	.26	.25	.30
Palmitate, bbls ....lb.	.83	nom.	.33	.83	.33	nom.
Silicofluoride, bbls .....lb.	.15	nom.	.11	.15	.11	.11½
Stearate, bbls ....lb.	...	.31	.23	.31	.23	.27
Manganese, acetate, drs ..lb.	...	.26½	...	.26½	..	.26½
Borate, 30%, 200 lb bbls lb.	.15	16	.15	.16	.15	.16
Chloride, bbls ....lb.	.14	nom.	...	.14	...	...
Dioxide, tech (peroxide), paper bgs, c-l ....ton	...	71.50	...	71.50	62.50	70.00
Hydrate, bbls ....lb.	...	.82	...	.82	...	.82
Linoleate, liq, drs .....lb.	.18	.19½	.18	.19½	.18	.19½
solid, precip, bbls ....lb.	...	19	...	.19	...	.19
Resinate, fused, bbls ...lb.	.08¼	.08½	.08¼	.08½	.08¼	.08½
precip, drs ....lb.	...	.12	...	.12	...	.12
Sulfate, tech, anhyd, 90-95%, 550 lb drs .....lb.	.10½	.11½	.10½	.11½	.08	.09¾
Mangrove, 55%, 400 lb bbls lb.						
Bark, African ....ton	37.00	38.00	34.00	38.00	30.00	39.50
Mannitol, pure cryst, cs, wks lb.	...	.85	.85	.90	.90	1.00
commercial grd, 250 lb bbls ....lb.		.40	.35	.45	.38	.50
Marble Flour, blk ....ton	12.00	14.00	12.00	14.00	12.00	14.00
Mercury chloride (Calomel) lb.	...	2.70	...	2.70	2.45	2.95
Mercury metal ..76 lb. flasks	192.00	195.00	167.00	195.00	163.00	228.50
Mesityl Oxide, f.o.b. dest., tks ....lb.	...	.10½	.10½	.15	...	.15
drs, c-l ....lb.	...	.11½	.11½	.16	. .	.16
drs, lcl ....lb.	...	.12	.12	.16½	...	.16½
Meta-nitro-aniline ....lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls ....lb.	1.05	1.10	1.05	1.10	1.05	1.40
Meta-phenylene diamine 300 lb bbls ....lb.	...	.65	...	.65	...	.65
Meta-toluene-diamine 300 lb bbls ....lb.	...	.70	.65	.70	.65	.67
Methanol, denat, grd, drs, c-l frt all'd *(FP)* *(PC)* gal.	...	.60	...	.60	...	.40
tks, frt all'd ....gal.	...	.60	...	.60	...	.40

Current

	Current	Market	1941 Low	1941 High	1940 Low	1940 High
Methanol (continued):						
Pure, drs, c-l, frt all'd gal.	...	.55½	.35½	.55½	.35	.38
tks ....gal.	...	.50	.30	.50	.30	.33
95%, tks ....gal.	...	.52	.29	.52	.28	.31
97%, tks ....gal.	...	.51	.30	.51	.29	.32
Methyl Acetate, tech tks, delv ....lb.	.06	.07	.06	.07	.06	.07
55 gal drs, delv ......lb.	.11	.12½	.07	.12½	.07	.08
C.P. 97-99%, tks, delv lb.	.09½	.10½	.09½	.10½	.09½	.10½
55 gal drs, delv .....lb.	.12	.13	.10½	.13	.10½	.11½
Acetone, frt all'd, drs gal. *p*	...	.81	.37½	.81	.41	.44
tks, frt all'd ......gal. *p*	...	.75	.32	.75	.35	.39
Synthetic, frt all'd, east of Rocky M.,						
drs ....gal. *p*	...	.51	.37½	.51	.36	.44
tks, frt all'd ...gal.	...	.43	.32	.43	.32	.36
West of Rocky M.,						
frt all'd, drs...gal *p*	...	.53½	.41½	.53½	.41½	.48
tks, frt all'd ..gal. *p*	...	.45½	.35	.45½	.35	.45½
Anthraquinone ....lb.	...	.83	...	.83	...	.83
Butyl Ketone, tks ......lb.	...	.10½	...	.10½	...	.10½
Cellulose, 100 lb lots, frt all'd ....lb.	...	.55	...	.55	.55	.70
less than 100 lbs. f.o.b. wks ....lb.	...	.60	...	.60	.60	.75
Chloride, 90 lb. cyl ....lb.	.32	.40	.32	.40	.32	.40
Ethyl Ketone, tks, frt all'd lb.	...	.07½	.06	.07½	.05½	.06
50 gal drs, frt all'd, c-l lb.	...	.08½	.07	.08½	.06½	.07½
Formate, drs, frt all'd ..lb.	...	.89	...	.89	...	.89
Hexyl, Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Lactate, drs, frt all'd ..lb.	...	.80	...	.80	...	.80
Mica, dry grd, bgs, wks..ton	...	30.00	...	30.00	...	30.00
Michler's Ketone, kgs ....lb.	...	2.50	...	2.50	...	2.50
Mixed Amylnaphthalenes mixed, ref., l-c-l, drs, f.o.b. wks ....lb.	...	.16	.16	.19	...	...
crude ....lb.	...	.14	.14	.15	...	...
Monoamylamine, c-l, drs, wks lb.	...	.50	.50	.52	...	.52
lcl, drs, wks ....lb.	...	.53	...	.55	...	.55
Monoamylnaphthalene, l-c-l, drs, f.o.b. wks .... lb	...	.17	.17	.20	...	...
Monobutylamine, drs	...	.37	...	.37	...	...
c-l, wks .... lb	...	.40	...	.40	...	.50
lcl, wks ....lb.	...	.48	...	.48	...	.48
Monochlorobenzene, see "C"						
Monoethanolamine, tks, wks, lb.	...	.23	...	.23	...	.23
Monoethylamine (100% basis) lcl, drs, f.o.b. wks .....lb.	...	.35	.35	.65	...	.65
Monomethylamine, drs, frt all'd, E. Mississippi, c-l lb.	...	.65	...	.65	...	.65
Monomethylparamiosulfate, 100 lb drs ....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Morpholine, drs 55 gal, wks ....lb.	...	.67	...	.67	...	.75
Myrobalans 25%, liq bbls lb.	no prices		no prices		no prices	
50% Solid, 50 lb boxes lb.	no prices		no prices		no prices	
J1 bgs ....ton	no prices		35.00	48.00	28.50	40.00
J2 bgs ....ton	no prices		28.00	39.00	23.00	34.00
Naphtha, v.m.&p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-white, tks ....gal.	...	.26	...	.26	.26	.27
drs, c-l ....gal.	...	.31	...	.31	.31	.32
Naphthalene, dom, crude bgs, wks .... lb. *q*	2.50	2.75	2.25	2.75	2.25	2.75
imported, cif, bgs ....lb.	no prices		no prices		...	3.00
Balls, flakes, pks ......lb.	...	.08	.06¼	.08	.06¼	.07¾
Balls, ref'd bbls, wks...lb.	...	.08	.07	.08	.06¾	.07
Flakes, re'd, bbls, wks lb.	...	.08	.07	.08	.06¾	.07
Nickel Carbonate, bbls ...lb.	.36	.36½	.36	.36½	.36	.36½
Chloride, bbls ....lb.	.18	.20	.18	.20	.18	.20
Metal ingot ....lb.	.35	.36	.34	.36	.34	.35
Oxide, 100 lb kgs, NY lb.	.35	.38	.35	.38	.35	.38
Salt, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, sulfate, 40%, drs, 55 lb drs ....lb.	...	.703	...	.703	...	.70
Nitre Cake, blk ....ton	...	16.00	...	16.00	...	16.00
Nitrobenzene redistilled, 1000 lb drs, wks ....lb.	.08	.09	.08	.09	.08	.10
tks ....lb.	...	.07	...	.07	...	.07
Nitrocellulose, c-l, lcl, wks lb.	.20	.29	.20	.29	.20	.29
Nitrogen Sol. 45½% ammon, f.o.b. Atlantic & Gulf ports, tks, unit ton, N basis	...	1.2158	...	1.2158	...	1.2158
Nitrogenous Mat'l, bgs imp unit	no prices		no prices		2.20	2.60
dom, Eastern wks ....unit	2.25	3.00	2.20	3.00	2.20	2.90
dom, Western wks ....unit	2.25	nom.	1.75	2.25	1.95	2.00
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Alleppo, bgs ....lb.	no prices		.26	.29	.28	.30
Oak Bark Extract, 25%, bbls lb.	.03½	.03¾	.03⅛	.03¾	.03⅛	.03⅜
tks ....lb.	...	.03	.02¾	.03	...	.02¾
Octyl Acetate, tks, wks ..lb.	...	.15	...	.15	...	.15
Orange-Mineral, 1100 lb cks NY ....lb.	...	.11½	.11	.11½	.10½	.13½
Orthoaminophenol, 50 lb kgs lb.	2.15	2.25	2.15	2.25	2.15	2.25
Ortho amyl phenol, l-c-l, drs, f.o.b. wks ....lb.	...	.25	.15	.25	...	...
Orthoanisidine, 100 lb drs lb.	...	.70	...	.70	.70	.74
Orthochlorophenol, drs ...lb.	...	.32	...	.32	...	.32
Orthocresol, 30.4°, drs, wks lb.	.17	.17½	.16	.17½	.16	.16½
Orthodichlorobenzene, 1000 lb drs ....lb.	.06	.07	.06	.07	.06	.07
Orthonitrochlorobenzene, 1200 lb drs, wks ....lb.	.15	.18	.15	.18	.15	.18

a Country is divided in 4 zones, prices varying by zone; *p* Country is divided into 4 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila., or N. Y.

(*FP*) Full Priority.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Orthonitroparachlorphenol, tins ... lb.	...	.75	...	.75	...	.75
Orthonitrophenol, 350 lb drs ... lb.	.85	.90	.85	.90	.85	.90
Orthonitrotoluene, 1000 lb drs, wks ... lb.	...	.09	...	.09	...	.09
Orthotoluidine, 350 lb bbls, lcl ... lb.	...	.19	...	.19	...	.19
Osage Orange, cryst, bbls lb.	...	.23	.21	.23	...	.21
51° liquid ... lb.	...	.10	...	.10	...	.10
Paraffin, rfd, 200 lb bgs						
122-127° M P ... lb.	...	.057	...	.057	.02¼	.0675
128-132° M P ... lb.	.057	.0595	.057	.0595	.057	.0705
133-137° M P ... lb.	.06¼	.06½	.06¼	.06½	.06¼	.0755
Para aldehyde, 99%, tech, 55-110 gal drs, wks .. lb.	...	.12	.10	.12	.10	.11¼
Aminoacetanilid, 100 lb kgs ... lb.	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs ... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs ... lb.	...	.32	...	.32	...	.32
Dichlorobenzene 200 lb drs, wks ... lb.	.11	.12	.11	.12	.11	.12
Formaldehyde, drs, wks (*FP*) ... lb.	.23	.24	.23	.24	.34	.35
Nitroacetanilid, 300 lb bbls ... lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks ... lb.	...	.45	...	.45	.45	.47
Nitrochlorobenzene, 1200 lb drs, wks ... lb.	...	.15	...	.15	.15	.16
Nitro-orthotoluidine, 300 lb bbls ... lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	...	.35	...	.35	.35	.37
Nitrosodimethylaniline, 120 lb bbls ... lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	...	.30	...	.30	...	.30
Phenylenediamine, 350 lb bbls ... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb bbls ... lb.	...	.70	...	.70	.70	.75
tks, wks ... lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks ... lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks ... lb.	...	.48	...	.48	.48	.50
Paris Green, dealers, drs lb.	.24	.26	.23	.25	.23	.26
Pentane, normal, 28-38° C, group, 3 tks ... gal.	...	.08½	...	.08½	...	.08½
drs, group 3 ... gal.	.11½	.16	.11½	.16	.11½	.16
Perchlorethylene, 10 lb drs, frt all'd ... lb.	.08	.08½	.08	.08½	.08	.08¼
Petrolatum, dark amber, bbls ... lb.	...	.03½	.02¾	.03½	.02¾	.05
White, lily, bbls ... lb.	...	.05¾	.04¾	.05¾	.04¾	.08½
White, snow, bbls ... lb.	...	.06½	.05½	.06½	.05½	.09½
Petroleum Ether, 30-60°, group 3, tks ... gal.	...	.13½	...	.13½	...	.13½
drs, group 3 ... gal.	...	.14½	...	.14½	.14½	.25½
PETROLEUM SOLVENTS AND DILUENTS						
Cleaners naphthas, group 3, tks ,wks ... gal.	.07⅛	...	.07	.07⅛	.06⅞	.07
East Coast, tks, wks gal.	.10½	...	.10	.10½	.09	.10½
Lacquer diluents, tks						
East Coast ... gal.	...	.11	.09½	.11	.09½	.10
Group 3, tks ... gal.	.07⅜	.08⅛	.06¼	.08⅛	.07⅜	.07⅞
Naphtha, V.M.P., East tks, wks ... gal.	.11	...	.09	.11	.09½	.10
Group 3, tks, wks ... gal.	.07⅛	...	.06	.07⅛	.06⅜	.07⅞
Petroleum thinner, 43-47, East, tks, wks ... gal.	.08¼	.09½	.08¼	.09½	.08¼	.09½
Group 3, tks, wks .. gal.	.06	.07	.05⅞	.07	.05⅞	.07
Rubber Solvents, stand grd, East, tks, wks .. gal.	...	.10½	.09½	.10½	.09½	.10
Group 3, tks, wks .. gal.	...	.07⅛	.06	.07⅛	.06⅜	.07⅞
Stoddard Solvents, East, tks, wks ... gal.	...	.09½	.083	.09½	.08¾	.09½
Group 3, wks ... gal.	...	.06⅝	.05½	.06⅝	.06⅜	.06½
Phenol, 250-100 lb drs ... lb.	.12½	...	.12	.13¾	.12	.14¼
tks, wks (*FP*) ... lb.	.11½	.12	.11	.12	.11	.12
Phenyl-Alpha-Naphthylamine, 100 lb kgs ... lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs ... lb.	...	.17	...	.17	...	.17
Phenylhydrazine Hydrochloride, com ... lb.	...	1.50	...	1.50	...	1.50
Phloroglucinol, tech, tins lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tons ... lb.	20.00	22.00	20.00	22.00	20.00	22.00
Phosphate Rock, f.o.b. mines						
70% basis ... ton	2.30	2.40	2.15	2.40	1.85	1.90
72% basis ... ton	2.75	3.00	2.50	3.00	2.15	2.35
Florida Pebble, 68% basis ton	no prices		...	1.90	1.90	2.85
75-74% basis ... ton	no prices		...	2.90	2.90	3.85
Tennessee, 72% basis .. ton	...	4.50	...	4.50	...	4.50
Phosphorus Oxychloride 175 lb. cyl (*FP*) ... lb.	.15	.18	.15	.18	.15	.20
Red, 110 lb cases ... lb.	.40	.44	.40	.44	.40	.44
Sesquisulfide, 100 lb cs .. lb.	.38	.42	.38	.42	.38	.44
Trichloride, cyl ... lb.	.15	.16	.15	.16	.15	.18
Yellow, 110 lb cs, wks lb.	.18	.20	.18	.20	.18	.20
Phthalic Anhydride, ,100 lb drs, wks ... lb.	.14½	.15½	.14½	.15½	.14½	.15½
Pine Oil, 55 gal drs or bbls						
Destructive dist ... lb.	...	.65	.50	.65	.53	.56
Steam dist wat wh bbls gal.	.65	.68	.59	.68	...	.59
Pitch Hardwood, wks ... ton	23.75	24.00	23.75	24.00	23.75	24.00
Coaltar, bbls, wks ... ton	19.00	22.00	19.00	22.00	...	19.00

(*FP*) Full Priority.

Current

Pitch, Burgundy
Rosins

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Pitch (continued)						
Burgundy, dom, bbls, wks lb.	.05½	.06	.06	.06½	.05½	.06½
Imported ....lb.	no prices		no prices		no prices	
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls ....bbl.	6.75	7.00	6.00	7.00	6.00	6.50
Polyamylnaphthalene, l-c-l, drs, f.o.b. wks ....lb.	...	.25	.25	.30	...	...
Potash, Caustic, wks, sol ..lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
flake ....lb.	...	.07	...	.07	.07	.07½
liquid, tks ....lb.	...	.02⅞	...	.02⅞	.02⅞	.03¾
Manure Salts, Dom 30% basis, blk .....unit	...	.60	...	.60	.53½	.58½
Potassium Abietate, bbls ..lb.	...	.08	...	.08	.08	.09
Acetate, tech, bbls, delv lb.	...	.28	.26	.28	...	.26
Bicarbonate, USP, 320 lb bbls ....lb.	...	.14	.14	.17	...	.18
Bichromate Crystals, 725 lb cks* (*FP*) ....lb.	.09⅝	...	.08⅞	.09⅝	.08¾	.09¼
Binoxalate, 30 lb bbls ..lb.	...	.23	...	.23	...	.23
Bisulfate, 100 lb kgs ...lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800 lb cks ....lb.	.06½	.06¾	.06½	.06¾	.06½	.07
liquid, tks ....lb.	...	.0275	...	.0275	.0275	.03
drs, wks ....lb.	.03	.03⅛	.03	.03⅛	.03	.03½
Chlorate crys, 112 lb kgs, wks (*FP*) ....lb.	nom.	.11	...	.11	.10½	.13
gran, kgs ....lb.	.12	.14½	.12	.14½	.12	.14½
powd, kgs ....lb.	.09½	.10	.09½	.10	.10	.12½
Chloride, crys, bbls ....lb.	.08	nom.	.04	.08	.04	.04¼
Chromate, kgs (*FP*) ...lb.	.24	.27	.24	.27	.24	.27
Cyanide, drs ....lb.	...	.55	...	.55	.55	.75
Iodide, 250 lb bbls .....lb.	1.35	1.38	1.35	1.38	...	1.35
Metabisulfite, 300 lb bbls lb.	.18	.20	.18	.21	.13	.19
Muriate, bgs, dom, blk unit	.56	.58	.53½	.58	...	.53½
Oxalate, bbls ....lb.	.28	.30	.25	.30	.25	.26
Perchlorate, kgs, wks (*FP*) ....lb.	.09½	.11	.09½	.11	.09½	.11
Permanganate, USP, crys, 500 & 1000 lb drs, wks (*FP*) ....lb.	.20½	.21	.19¼	.21	.18½	.20½
Prussiate, red, bbls ....lb.	no prices		no prices		.38	.45
Yellow, bbls ....lb.	.17	.19	.16	.19	.15	.18
Sulfate, 90% basis, bgs ton	...	36.25	...	36.25	34.25	36.25
Titanium Oxalate, 200 lb bbls ....lb.	...	.40	...	.40	.40	.45
Pot & Mag Sulfate, 48% basis bgs ....ton	...	26.00	26.00	27.00	24.75	27.00
Propane, group 3, tks ....lb.	.03¾	.04	.03¾	.04	.03	.04⅜
Putty, com'l, tubs ....100 lb.	...	3.15	...	3.15	...	6.00
Linseed Oil, kgs ....100 lb.	...	5.00	...	5.00	...	4.50
Pyrethrum, conc liq:						
2.4% pyrethrins, drs, frt all'd ....gal.	4.25	4.45	4.40	4.95	4.75	7.50
3.6% pyrethrins, drs, frt all'd ....gal.	6.45	...	6.60	7.20	7.20	11.00
Flowers, coarse, Japan, bgs ....lb.	.20	.21	.20	.25	.23	.36
Fine powd, bbls .....lb.	.21	.22	.21	.26	.25	.37
Pyridine, denat, 50 gal drs gal.	...	1.71	...	1.71	...	1.71
Refined, drs ....lb.	...	.48	...	.48	...	.51
Pyrites, Spanish cif Atlantic ports, blk ....unit	no prices		no prices		.12	.13
Pyrocatechin, CP, drs, tins lb.	2.15	2.40	2.15	2.40	2.15	2.40
Quebracho, 35% liq tks ..lb.	...	.05½	.03¾	.05½	.03¼	.03¾
450 lb bbls, c-l ......lb.	...	.05	.04¼	.05	.04	.04¼
Solid, 63%, 100 lb bales cif ....lb.	...	.04⅞	.	.04⅞	.04½	.04⅞
Clarified, 64% bales ..lb.	...	.05	.05	.05⅛	.04¾	.05⅛
Quercitron, 51 deg liq, 450 lb. bbls ....lb.	.08½	.09½	.08½	.09½	.08½	.09½
Solid, drs ....lb.	.11	.16½	.11	.16½	.10	.16½
R Salt, 250 lb bbls, wks lb.	...	.55	...	.55	...	.55
Resorcinol, tech, cans ....lb.	.68	.74	.68	.74	.75	.80
Rochelle Salt, cryst ......lb.	.43½	...	.32½	.43½	.22¼	.29¾
Powd, bbls ....lb.	.42½	...	.31½	.42½	.21¾	.28¾
Rosin Oil, bbls, first run gal.	...	.48	.40	.50	...	.50
Second run ....gal.	...	.50	.42	.56	.52	.56
Third run, drs ....gal.	...	.54	.46	.57	.56	.57
Rosins 600 lb bbls, 100 lb unit ex. yard NY:**						
B	...	2.97	2.06	3.02	1.80	2.45
D	...	2.97	2.08	3.03	1.87	2.48
E	...	2.98	2.07	3.03	1.95	2.51
F	...	2.99	2.08	3.03	2.10	2.51
G	...	3.01	2.18	3.03	2.10	2.48
H	...	2.99	2.27	3.03	2.10	2.48
I	...	2.97	2.26	3.05	2.10	2.54
K	...	2.97	2.36	3.05	2.12	2.75
M	...	3.16	2.38	3.16	2.20	2.81
N	...	3.16	2.47	3.16	2.39	2.85
WG	...	3.33	2.79	3.20	2.68	3.17
WW	...	3.45	3.05	3.48	3.00	3.40
X	...	3.45	3.10	4.49	...	...
Rosins, Gum, Savannah (280 lb. unit):**						
B	...	2.50	1.31	2.92	1.15	1.80
D	...	2.54	1.51	2.96	1.22	1.83
E	...	2.54	1.60	2.96	1.30	1.86
F	...	2.52	1.62	2.96	1.45	1.86
G	...	2.41	1.60	2.96	1.45	1.83
H	...	2.41	1.63	2.97	1.45	1.83
I	...	2.42	...	2.98	1.45	1.89
K	...	2.43	1.84	3.00	1.47	2.10
M	...	2.61	2.01	3.03	1.55	2.16

* Spot price is ⅛c higher. ** Jan. 24, 1941, high and low based on 280 lb. unit.

(*FP*) Full Priority.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Rosins (continued):						
N	...	2.60	2.65	3.03	1.70	2.20
WG	...	2.85	2.76	3.10	2.03	2.52
WW	...	3.00	2.96	3.46	2.25	2.75
X	...	3.00	2.96	3.40	2.35	2.75
Rosin, Wood, c-l, FF grade, NY	1.70	2.00	1.40	2.00	1.40	1.54
Rotten Stone, bgs mines ton	25.50	37.50	25.50	37.50	25.50	37.50
Imported, lump, bbls ... lb.	no prices		no prices		...	.14
Powdered, bbls ...... lb.	no prices		no prices		.08½	.10
Sago Flour, 150 lb bgs .. lb.	.05	.05½	.03½	.05½	.04	.04½
Sal Soda, bbls wks ... 100 lb.	...	1.20	...	1.20	...	1.20
Salt Cake, 94-96%, c-l, bulk wks ... ton	...	15.00	13.00	17.00	...	17.00
Chrome, c-l, wks ...... ton	...	16.00	...	16.00	11.00	16.00
Saltpetre, gran, 450-500 lb bbls ... lb.	...	.081	.076	.081	.071	.08
Cryst, bbls ... lb.	...	.091	.086	.091	.081	.08¾
Powd, bbls ... lb.	...	.091	.086	.091	.081	.10
Satin, White, pulp, 550 lb bbls ... lb.	.01¼	.01½	.01¼	.01½	.01¼	.01½
Schaeffer's Salt, kgs ..... lb.	...	.46	...	.46	.46	.48
Shellac, Bone dry, bbls .. lb. *r*	.37	.38	.26	.38	.23	.27
Garnet, bgs ... lb.	.30	.31	.20	.31	.18½	.23
Superfine, bgs ... lb. *s*	.30	.31	.16½	.31	.14½	.20½
T. N., bgs ... lb. *s*	.29	.30	.16	.30	.13½	.19½
Silver Nitrate, vials ..... oz.	...	.24	.24	.26⅞	.26¾	.27⅜
Slate Flour, bgs, wks .... ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks ... 100 lb.	...	1.10	...	1.10	...	1.10
58% light, bgs ..... 100 lb.	1.05	1.08	1.05	1.08	1.05	1.08
blk ... 100 lb.	...	.90	...	.90	...	.90
paper bgs ... 100 lb.	1.05	1.08	1.05	1.08	1.05	1.08
bbls ... 100 lb.	...	1.35	1.35	1.45	1.35	1.45
Caustic, 76% grnd & flake, drs ... 100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drs ..... 100 lb.	...	2.30	...	2.30	...	2.30
Liquid sellers, tks .. 100 lb.	...	2.00	...	2.00	1.95	1.97½
SODIUM						
Sodium Abietate, drs ..... lb.	...	.11	...	.11	...	.11
Acetate, 60% tech, gran, powd, flake, 450 lb bbls wks ... lb.	.04½	.05	.04	.06	.04	.05
90%, bbls, 275 lb delv lb.	.06½	.07	.06	.07	.06	.06¾
anhyd, drs, delv ..... lb.	.08½	.10	.08¼	.10	.08¼	.10
Alginate, drs ... lb.	.39	.70	.39	.70	.39	.96
Antimoniate, bbls ...... lb.	.15	.15½	.14	.15½	.14½	.15
Arsenate, drs ... lb.	.08	...	.07	.08¾	.07	.08¾
Arsenite, liq, drs ..... gal.	...	.35	...	.35	...	.35
Dry, gray, drs, wks .. lb.	...	.06¾	.06½	.09¼	.06½	.09½
Benzoate, USP kgs .... lb.	.46	.50	.46	.50	.46	.52
Bicarb, powd, 400 lb bbl, wks ... 100 lb.	...	1.70	...	1.70	1.70	1.85
Bichromate, 500 lb cks, wks* (*FP*) ... lb.	...	.07⅜	.06⅞	.07½	.06¼	.07¼
Bisulfite, 500 lb bbls, wks lb.	.03	.031	.03	.031	.03	.031
35-40% sol bbls, wks 100 lb.	1.40	1.80	1.40	1.80	1.30	1.80
Chlorate, bgs, wks ..... lb.	...	.06¼	...	.06¼	.06¼	.08½
Cyanide, 96-98%, 100 & 250 lb drs, wks ...... lb.	.14	.15	.14	.15	.14	.15
Diacetate, 33-35% acid, bbls, lcl, delv ... lb.	...	.10	.09	.10	.08½	.09
Fluoride, white 90%, 300 lb bbls, wks ... lb.	...	.08	.07	.08	.07	.08
Hydrosulfite, 200 lb bbls, f.o.b. wks ... lb.	.17	.18	.17	.18	.16	.17
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	...	2.80	...	2.80	2.80	3.05
Tech, reg cryst, 375 lb bbls, wks ... 100 lb.	2.45	...	2.45	...	2.45	2.80
Iodide, jars ... lb.	...	2.42	...	2.42	2.30	2.42
Metanilate, 150 lb bbls .. lb.	.41	nom.	.41	nom.	.41	.42
Metasilicate, gran, c-l, wks ... 100 lb.	...	2.50	2.35	2.50	...	2.35
cryst, drs, c-l, wks 100 lb.	...	3.05	...	3.05	...	3.05
Anhydrous, wks, cl, drs ... 100 lb.	...	4.00	3.75	4.00	3.75	3.75
wks, lcl, drs, .. 100 lb.	5.05	5.05	5.05	5.05	5.05	5.05
Monohydrated, bbls .... lb.	...	.026	.023	.026	...	.023
Naphthenate, drs ...... lb.	.12	.19	.12	.19	.12	.19
Naphthionate, 300 lb bbl lb.	...	.50	...	.50	...	.50
Nitrate, 92% crude, 200 lb. bgs, c-l, NY ... ton	...	29.35	28.70	29.35	...	28.30
100 bgs, same basis .. ton	...	30.05	29.40	30.05	...	29.00
Bulk ... ton	...	27.00	...	27.00	...	27.00
Nitrite, 500 lb bbls .... lb.	.06¾	...	.06¾	.11½	.06¾	.11½
Othochlorotoluene, sulfonate, 175 lb bbls, wks lb.	.25	.27	.25	.27	.25	.27
Orthosilicate, 300 lb drs, c-l ... lb.	...	.04½	.03	.04½	...	.03
Perborate, drs, 400 lb .. lb.	.14¾	...	.14¾	.15¼	.14¾	.15¼
Peroxide, bbls, 400 lb .. lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	2.75	2.90	2.30	2.90	...	2.30
bgs, wks ... 100 lb.	2.55	2.70	2.10	2.70	...	2.10
Tri-sodium, tech, 325 lb bbls, wks ...... 100 lb.	2.90	3.05	2.45	3.05	...	2.45
bgs, wks ... 100 lb.	2.70	2.85	2.25	2.85	...	2.25
Picramate, 160 lb kgs .. lb.	...	.65	...	.65	.65	.67
Prussiate, Yellow, 350 lb bbls, wks ... lb.	.11	...	.10½	.11	.09½	.10¾
Pyrophosphate, anhyd, 100 lb bbls f.o.b. wks frt eq lb.	.0510	.0610	.0510	.0610	...	.0530

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; *s* T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y.

(*FP*) Full Priority.

Current

Sodium Sesquisilicate
Titanium Calcium Pigment

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Sodium (continued):						
Sesquisilicate, drs, c-l, wks ....100 lb.	...	3.05	...	3.05	2.00	2.90
Silicate, 60°, 55 gal drs, wks ....100 lb.	no prices		1.40	1.80	1.40	1.80
40°, 55 gal drs, wks 100 lb	...	.80	...	.80	...	.80
tks, wks ....100 lb.	no prices		...	.65	...	.65
Silicofluoride, 450 lb bbls NY ....lb.	.12	.15	.09¾	.15	...	...
Stannate, 100 lb drs ....lb.	.33½	.36½	.32½	.37	.31½	.35½
Stearate, bbls ....lb.	.19	.24	.19	.24	.19	.24
Sulfanilate, 400 lb bbls lb.	.16	.18	.16	.18	.16	.18
Sulfate, Anhyd, 550 lb bgs c-l, wks ....100 lb. †	1.70	1.90	1.45	1.90	1.45	1.90
Sulfide, 80% cryst, 440 lb. bbls, wks ....lb.	.024	...	.02¼	.03	.02¼	.03
Solid, 650 lb drs, c-l, wks ....lb.	.0315	...	.03	.03¾	.03	.03¾
Sulfite, powd, 400 lb bbls wks ....lb.	...	.05¼	...	.05¼	.023	.05¼
Sulfocyanide, drs ......lb.	.55	.65	.28	.65	.28	.47
Sulforicinoleate, bbls ...lb.	...	.12	...	.12	...	.12
Supersilicate (see sodium sesquisilicate)						
Tungstate, tech, crys, kgs lb.	no prices		no prices		no prices	
Sorbitol, com, solut, wks c-l, drs, wks ....lb.	...	.14¾	...	.14¾	.14¾	.16
Spruce, Extract, ord, tks ..lb.	...	.01¼	.01⅛	.01¼	...	.01⅛
Ordinary, bbls .....lb.	...	.01¾	.01⅝	.01¾	...	.01⅝
Super spruce ext, tks ..lb.	...	.01½	.01⅜	.01½	...	.01⅜
Super spruce ext, bbls ..lb.	...	.02	.01⅞	.02	...	.01⅞
Super spruce ext, powd, bgs ....lb.	...	.04	...	.04	...	.04
Starch, Pearl, 140 lb bgs 100 lb.	...	3.10	2.90	3.10	2.50	2.95
Powd, 140 lb bgs ...100 lb.	...	3.20	3.05	3.80	2.60	3.05
Potato, 200 lb bgs .....lb.	.0585	...	.04½	.0585	.05	.07½
Imp, bgs ....lb.	no prices		no prices		...	.06½
Rice, 200 lb bbls ....lb.	.08½	.09½	.07½	.09½	.07¼	.08½
Sweet Potato, 240 lb bbls, f.o.b. plant ......100 lb.	nom.	7.00	nom.	7.00	5.50	7.00
Wheat, thick, bgs .....lb.	...	.05	...	.05	.05¼	.05½
Strontium, carbonate, 600 lb bbls, wks ....lb.	no prices		no prices		.22	.23
Nitrate, 600 lb bbls, NY lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
Sucrose, octa-acetate, den, grd, bbls, wks ....lb.	...	.45	...	.45	...	.45
tech, bbls, wks ....lb.	...	.40	...	.40	...	.40
SULFUR						
Sulfur, crude, f.o.b. mines ton	...	16.00	...	16.00	...	16.00
Flour, com'l, bgs ...100 lb.	1.65	1.95	1.40	1.95	1.40	2.35
bbls ....100 lb.	1.95	2.50	1.95	2.50	1.95	2.70
Rubbermakers, bgs..100 lb.	...	2.05	...	2.05	2.00	2.80
bbls ....100 lb.	...	2.35	...	2.35	2.35	3.15
Extra fine, bgs .....100 lb.	...	2.35	...	2.35	2.85	3.00
Superfine, bgs .....100 lb.	2.65	2.80	2.65	2.80	2.65	2.80
bbls ....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs ....100 lb.	3.05	3.35	2.80	3.35	2.80	3.75
bbls ....100 lb.	3.40	3.70	3.15	3.70	3.15	4.10
Roll, bgs ....100 lb.	2.40	2.70	2.15	2.70	2.15	3.10
bbls ....100 lb.	2.30	2.85	2.30	2.85	2.50	3.25
Sulfur Chloride, 700 lb drs, wks ....lb.	.03	.08	.03	.08	.03	.08
Sulfur Dioxide, 150 lb cyl lb.	.07	.09	.07	.09	.07	.09
Multiple units, wks ....lb.	.04½	.07	.04½	.07	.04½	.07
tks, wks ....lb.	.04	.06	.04	.06	.04	.06
Refrigeration, cyl, wks lb.	.16	.40	.16	.40	.16	.40
Mutiple units, wks ....lb.	.07½	.10	.07½	.10	.07½	.10
Sulfuryl Chloride ....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd .....ton	no prices		no prices		98.00	140.00
Extract, 42°, bbls ......lb.	.08	.06¼	.06	.08	.06	.06¼
Superphosphate, 16% bulk, wks ....ton	...	10.00	8.50	10.00	8.50	9.00
Run of pile ....ton	...	9.50	8.00	9.50	8.00	8.50
Triple, 40-48%, a.p.a. bulk, wks, Balt. unit ......ton	no prices		...	.68	.68	.70
Talc, Crude, 100 lb bgs, NY ton	14.00	16.00	14.00	16.00	14.00	15.00
Ref'd 100 lb bgs, NY ton	17.25	19.25	17.25	19.25	14.00	17.25
French, 220 lb bgs, NY ton	no prices		no prices		23.00	35.00
Ref'd, white bgs, NY ton	no prices		no prices		45.00	60.00
Italian, 220 lb bgs to arr ton	no prices		no prices		64.00	70.00
Ref'd, white bgs,, NY ton	no prices		no prices		65.00	78.00
Tankage, Grd, NY ...unit ᵘ	...	4.10	2.35	4.10	2.35	3.25
Ungrd ....unit ᵘ	...	5.10	2.35	5.10	2.35	3.25
Fert grade, f.o.b. Chgo unit ᵘ	...	5.60	2.35	5.60	2.40	3.50
South American cif unit ᵘ	...	4.75	2.60	4.75	2.50	3.50
Tapioca Flour, high grade, bgs ....lb.	.04¾	.06¾	.03	.06¾	.02¾	.05
Tar Acid Oil, 15%, drs ..gal.	.22	.24	.22	.24	.22	.24
25% drs ....gal.	.25	.27	.25	.27	.25	.28
Tar, pine, delv, drs ....gal.	...	.29	.26	.29	.26	.27
tks, delv, E. cities ....gal.	...	.22	...	.22	...	.21
Tartar Emetic, tech, bbls lb.	...	.47¾	.36¾	.47¾	.34¾	.36¾
USP, bbls ....lb.	...	.52¾	.42	.52¾	.40	.42
Terpineol, den grade, drs lb.	...	.17	...	.17	...	.17
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachlorethylene, drs, tech lb.	.08	.09	.08	.09	.08	.09½
Tetralene 50 gal drs, wks lb.	...	.21	...	.21	.12	.18
Thiocarbanilid, 170 lb bbls lb.	...	.24	...	.24	.20	.25
Tin, crystals, 500 lb. bbls, wks lb.	.39	.39½	.38	.40	.36	.40½
Metal, NY ....lb.	* ...	.52	.501	.52¾	.45½	.55
Oxide, bbls, wks lb.	.55	.57	.54	.56	.51	.56
Tetrachloride, 100 lb drs, wks ....lb.	...	.31	.25¼	.31	.23	.26½
Titanium Dioxide, 300 lb bbls lb.	...	.14½	.13¾	.14½	.13	.16
Barium Pigment, bbls ..lb.	.05¼	.06½	.05¾	.06½	.05¼	.06½
Calcium Pigment, bbls lb.	.05½	.05¾	.05½	.05¾	.05	.06¼

† Bags 15c lower; ᵘ + 10; * Sept. 30.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Titanium tetrachloride, drs, f.o.b. Niagara Falls ....lb.	.32	.45	.32	.45	.32	.45
Titanium trichloride 23% sol, bbls f.o.b. Niagara Falls lb.	.22	.26	.22	.26	.22	.26
20% solution, bbls .....lb.	.175	.215	.175	.215	.175	.215
Toluidine, mixed, 900 lb drs, wks ....lb.	...	.26	...	.26	.26	.27
Toluol, drs, wks (*FP*) ..gal.	...	.32	...	.32	.27	.32
tks, frt all'd (*FP*) ....gal.	...	.27	...	.27	.22	.27
Toner Lithol, red, bbls ...lb.	.55	.60	.55	.60	.55	.60
Para, red, bbls ....lb.	.70	.75	.70	.75	.70	.75
Toluidine, bgs ....lb.	...	1.05	...	1.05	1.05	1.35
Triacetin, 50 gal drs, wks, lb.	...	.26	...	.26	...	.26
Triamyl Borate, lcl, drs, wks, lb.	...	.27	...	.27	...	.27
Triamylamine, drs, lcl, wks, drs ....lb.	...	.90	...	.90	.78	.90
Tributylamine, lcl, drs, f.o.b. wks ....lb.	...	.70	...	.70	.67	.70
Tributyl citrate, drs, frt all'd lb.	.24	...	.24	.26	.24	.35
Tributyl Phosphate, frt all'd lb.	...	.47	.42	.47	...	.42
Trichlorethylene, 600 lb drs, frt all'd E. Rocky Mts lb.	.08	...	.08	.09	.08	.09
Tricresyl phosphate, tech, (*FP*) ....lb.	.25	...	.22	.36½	.22	.36½
Triethanolamine, 50 gal drs, wks ....lb.	...	.19	...	.19	.19	.22
tks, wks ....lb.	...	.18	...	.18	.18	.20
Triethylamine, lcl, drs, f.o.b. wks ....lb.	...	1.05	...	1.05	...	1.05
Triethylene glycol, drs, wks lb.	...	.26	...	.26	...	.26
Trihydroxyethylamine Oleate, bbls ....lb.	...	.30	...	.30	...	.30
Stearate bbls ....lb.	...	.30	...	.30	...	.30
Trimethyl Phosphate, drs, lcl, f.o.b. dest ....lb.	...	.54	.50	.54	...	.50
Trimethylamine, c-l, drs, frt all'd E. Mississippi ....lb.	...	.85	.85	1.00	...	1.00
Triphenylguanidine ....lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs (*FP*) ....lb.	...	.38	...	.38	.	.38
Tripoli, airfloated, bgs, wks ton	...	26.00	...	26.00	26.00	30.00
Turpentine (Spirits), c-l, NY dock, bbls ....gal.	...	.83	.45	.83	.32½	.40
Savannah, bbls ....gal.	...	.72½	.33½	.72½	.26½	.34
Wood Steam dist, drs, c--lcl, NY ....gal.	...	.76	.35	.76	.27	.34½
Wood, dest dist, cl-lcl, drs, delv E. cities ....gal.	...	.62	.35	.62	.25	.32
Urea, pure 112 lb cases ..lb.	...	.12	...	.12	.12	.15½
Fert grade, bgs, c. i. f. S.A. points ....ton	no prices		no prices		...	110.00
Dom f.o.b., wks ....ton	...	85.00	...	85.00	85.00	101.00
Urea Ammonia, liq., nitrogen basis ....ton	...	121,58	...	121.58	...	121.50
Valonia beard, 42%, tannin bgs ....ton	no prices		no prices		47.00	56.00
Cups, 32% tannin bgs..ton	no prices		no prices		33.00	39.00
Extract, powd, 63% ...lb.	no prices		no prices		.0565	.06
Vanillin, ex eugenol, 25 lb tins, 2000 lb lots .....lb.	...	2.60	...	2.60	...	2.60
Ex-guaiacol ....lb.	...	2.30	2.30	2.50	...	2.50
Ex-lignin ....lb.	...	2.55	2.50	2.55	...	2.50
Vermilion, English, kgs . lb.	3.12	3.17	3.12	3.17	...	2.76
Wattle Bark, bgs ....ton	41.00	43.30	37.50	43.00	34.00	38.75
Extract, 60°, tks, bbls. lb.	.05	.0475	.03⅞	.05	.03⅞	.04¼
Wax, Bayberry, bgs ......lb.	.18	.20	.18	.20	.25	.30
Bees, bleached, white 500 lb slabs, cases ....lb.	...	.56	.36½	.56	.35	.38
Yellow, African, bgs..lb.	no stocks		...	.30	.23	.29
Brazilian, bgs .....lb.	no stocks		.31	.32	.24	.31
Refined, 500 lb slabs, cases lb.	.51	.52	.35	.52	.29	.36
Candelilla, bgs ....lb.	.32	.33	.19	.32	.18	.19
Carnauba, No. 1, yellow, bgs ....lb.	.84	.85	.68	.86	.58	.85
No. 2, yellow, bgs ...lb.	.82	.83	.66	.85	.57	.84
No. 2, N. C., bgs ....lb.	.	.74	.62	.74	.46	.73
No. 3, Chalky, bgs ...lb.	.74	.75	.55	.77	.43	.66
No. 3, N. C., bgs ....lb.	.76½	.77½	.58	.79	.47	.68
Ceresin, dom, bgs .....lb.	.12½	.13	.11	.13	.11½	.15
Japan, 224 lb cases ....lb.	.30	.31	.16½	.35	.15½	.16½
Montan, crude, bgs ....lb.	no prices		no prices		no prices	
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.24	.25	.24	.25	.22	.25
Cakes, cases ....lb.	.25	.26	.25	.26	.23	.25
Wood Flour, c-l, bgs ....ton						
bgs, c-l, wks ....ton	24.00	25.00	24.00	25.00	20.00	30.00
Whiting, chalk, com 200 lb	18.00	19.00	18.00	19.00	11.50	19.00
Gilders, bgs, c-l, wks ..ton	16.00	20.00	16.00	20.00	12.00	20.00
Xylol, frt all'd, East 10* tks, wks ....gal.	...	.26	...	.29	...	.30
Com'l tks, wks, frt all'd gal.	...	.26	...	.26	...	.27
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.35	.36
Zein, bgs, 1000 lb lots, wks ....lb.	...	.20	...	.20	...	.20
Zinc Acetate, tech, bbls, lcl, delv ....lb.	.15	.16	.15	.16	.15	.16
Arsenite, bgs, frt all'd ..lb.	...	.12	...	.12	.12	.12½
Carbonate tech, bbls, NY lb.	.14	.16	.14	.16	.14	.16
Chloride fused, 600 lb drs, wks ....lb.	...	.05	...	.05	.04¼	.046
Gran, 500 lb drs, wks lb.	...	.0575	...	.0575	.05	.05¾
Soln 50%, tks, wks 100 lb.	...	2.50	2.25	2.50	...	2.25

* Aug. 29.

(*FP*) Full Priority.

Current

Zinc Cyanide
Oil, Whale

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Zinc (continued):						
Cyanide, 100 lb drs ....lb.	.33	.37	.33	.37	...	.33
Dust, 500 lb bbls, c-l, delv lb.	...	.09¼	...	.09¼	.07½	.08½
Metal, high grade slabs, c-l,						
NY ....1000 lb.	...	7.65	...	7.65	5.90	7.64
E. St. Louis .....100 lb.	...	7.25	...	7.25	4.60	7.25
Oxide, Amer, bgs, wks lb.	...	.06½	...	.06½	.06¼	.07½
French 300 lb bbls, wks lb.	...	.06¾	...	.06¾	.06¼	.07¾
Palmitate, bbls ....lb.	.24½	.27½	.24½	.27½	.23	.27½
Resinate, fused, pale bbls lb.	...	.10	...	.10	...	.10
Stearate, 50 lb bbls .....lb.	.25	.27	.22	.27	.21½	.24½
Sulfate, crys, 40 lb. bbls						
wks ....lb.	...	.365	.315	.365	.0275	.029
Flake, bbls ....lb.	...	.405	.335	.405	...	.0325
Sulfide, 500 lb bbls, delv lb.	...	.08	...	.08	.07¾	.08
bgs, delv ....lb.	...	.07¾	...	.07¾	.07½	.07¾
Sulfocarbolate, 100 lb kgs lb.	.24	.29	.24	.29	.24	.26
Zirconium Oxide, crude,						
70-75% grd, bbls, wks ton	75.00	100.00	75.00	100.00	75.00	100.00

Oils and Fats

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Babassu, tks, futures .....lb.	no prices		...	.06	.05¾	.06⅝
Castor, No. 3, 400 lb drs lb.	...	.12¼	.09¾	.12¼	.09¾	.12¾
Blown, 400 lb drs ...lb.	...	.14	.11¾	.14	.11¾	.14¾
China Wood, drs, spot NY lb.	...	.36	.27¼	.36	.22½	.28
Tks, spot NY ....lb.	...	.34½	.26¼	.34½	.21½	.27
Coconut, edible, drs NY ..lb.	.13¼	nom.	.08	.13¼	.07½	.09⅜
Manila, tks, NY ....lb.	.07⅝	nom.	.03⅜	.07⅝	.02¾	.03¼
Tks, Pacific Coast ....lb.	...	no prices		.03¼	.02¾	.03½
Cod, Newfoundland, 50 gal						
bbls ....gal.	.78	.80	.60	.80	.60	.72
Copra, bgs, NY ....lb.	.04¼	nom.	.0180	.04¼	.0165	.0190
Corn, crude, tks, mills ...lb.	.13	nom.	.06⅝	.13	.05⅛	.06½
Refd, 375 lb bbls, NY..lb.	.16	nom.	.14¾	.16	.07⅞	.09
Degras, American, 50 gal						
bbls, NY ....lb.	.08¼	.08¾	.07½	.08¾	.08	.10
Greases, Yellow ....lb.	...	.08½	.04¾	.08½	.03	.05¼
White, choice, bbls, NY lb.	...	.09	.05	.09	.03⅜	.05⅝
Lard, Oil, Edible, prime..lb.	...	.14½	.08½	.14½	.08	.10
Extra, bbls ....lb.	...	.13¾	.08¼	.13¾	.06¾	.09⅜
Extra, No. 1, bbls ......lb.	...	.13¼	.08	.13¼	.06⅞	.08⅞
Linseed, Raw less than 5						
drs lots ....lb.	...	.121	.091	.123	.09	.116
drs, c-l, spot ....lb.	.113	.115	.095	.190	.084	.110
Tks ....lb.	.1040	.1060	.084	.1060	.078	.104
Menhaden, tks, Baltimore gal.	.60	nom.	.30	.60	.21	.35
Refined, alkali, drs .....lb.	...	.122	.084	.122	.067	.088
Kettle boiled, drs ......lb.	...	.132	.096	.132	.079	.10
Light pressed, drs .....lb.	...	.112	.082	.112	.061	.085
Tks ....lb.	...	.10	.072	.10	.055	.072
Neatsfoot, CT, 20°, bbls, NY lb.	no prices		.18¼	.26½	.15¼	.19¼
Extra, bbls, NY ....lb.	...	.13½	.08¼	.13½	.06⅞	.09
Pure, bbls, NY ....lb.	...	.17¾	.12¼	.17¾	.08	.14¼
Oiticica, bbls ....lb.	.22	.22½	.16½	.22½	.17	.21
Oleo, No. 1, bbls, NY ...lb.	...	.11¾	.07⅜	.11¾	.07⅜	.07¾
No. 2, bbls, NY ......lb.	...	.12½	.07⅜	.12½	.07⅜	.07¾
Olive, denat, bbls, NY ..gal.	4.00	4.15	2.25	4.15	.94	2.40
Edible, bbls, NY .....gal.	4.85	5.00	4.75	5.25	1.85	3.25
Foots, bbls, NY ....lb.	.17	.17½	.10¼	.17¾	.08	.10¼
Palm, Kernel, bulk ....lb.	no prices		no prices		no prices	
Niger, cks ....lb.	.08½	nom.	.04¼	.08	.03¼	.05½
Sumatra, tks ....lb.	nom.	.07¾	.02	.07¾	.02⅛	.03
Peanut, crude, bbls, NY lb.	.13	nom.	.08¾	.13	.06¾	.09
Tks, f.o.b. mill ....lb.	no prices		.05¼	.07⅛	.05⅛	.07⅛
Refined, bbls, NY .....lb.	.16¼	nom.	.08	.16¼	.07⅜	.09¾
Perilla, drs, NY ....lb.	.22½	.23	.18	.23	.19	.21
Tks, Coast ....lb.	...	.21½	.16½	.21½	.18½	.20
Pine, see Pine Oil, Chem. Sec.						
Rapeseed, blown, bbls, NY lb.	nom.	.17½	.16½	.17½	.17	.17½
Denatured, drs, NY . gal.	no prices		.95	1.00	1.00	1.05
Red, Distilled, bbls ......lb.	.12	.13	.07¼	.13	.06¼	.09½
Tks ....lb.	.11¼	...	.06¼	.11½	.05¾	.08
Sardine, Pac Coast, tks. gal.	nom.	.62½	.39	.62½	.31	.39
Refined alkali, drs .....lb.	...	.122	.084	.122	.067	.088
Light pressed, drs .....lb.	...	.112	.078	.112	.061	.082
Tks ....lb.	...	.10	.072	.10	.055	.072
Sesame, white, dom ....lb.	nom.	.09½	...	.09½	.07¼	.11¾
Soy Bean, crude						
Dom, tks, f.o.b. mills ..lb.	.11½	nom.	.05½	.12¼	.04¾	.06¼
Crude, drs, NY .....lb.	.	.12¼	.06¼	.12¼	.05¾	.07¾
Ref'd, drs, NY ....lb.	.13½	nom.	.07⅝	.13½	.07¼	.08½
Tks ....lb.	...	.12¾	.05⅜	.12¾	.06¼	.07⅝
Sperm, 38° CT, bleached						
bbls, NY ....lb.	...	.127	.11	.127	.105	.11
45° CT, blchd, bbls, NY lb.	...	.12	.103	.12	.098	.103
Stearic Acid, double pressed						
dist bgs ....lb.	.12¾	.13¾	.09½	.13¾	.09¾	.13
Double pressed saponified						
bgs ....lb.	.13	.14	.09¾	.14	.10	.13¾
Triple pressed dist bgs lb.	.15½	.16½	.12½	.16½	.12½	.16½
Stearine, Oleo, bbls ......lb.	nom.	.09	..	.09	.05¼	.06½
Tallow City, extra loose..lb.	.07⅜		..	.07⅜	.03⅜	.05⅜
Edible, tierces ....lb.	no prices			.05⅛	.04⅜	.05¼
Acidless, tks, NY .....lb.	...	.11½	.07½	.11½	.06¼	.08
Turkey Red, single, drs ..lb.	...	.06½	.06½	.07	.082	.09
Double, bbls ....lb.	...	.09½	.09½	.11	11	.12¾
Whale:						
Winter bleach, bbls, NY lb	...	.1110	.099	.1110	...	.095
Refined, nat, bbls, NY lb.	...	.1070	.095	.1070	...	.091

PROFESSIONAL DIRECTORY

THE THREAT TO PROFESSIONAL STATUS

(An Editorial)

(*Continued from page 438*)

policies require that chemists and chemical engineers be compensated justly and with due consideration to the years of study and training required of such men and with due consideration also to the degree of responsibility such individuals carry in their positions. But we do not agree that a professional status is determined or defined by how much any individual receives as compensation.

Doctors, lawyers, dentists and certified public accountants are now firmly entrenched with full professional status largely, if not entirely, because they have fought for and won legal recognition in the various states. The question of the licensing of chemists has been debated now pro and con for several years with one group pulling this way and another pulling in an opposite direction. Valuable time has been lost in the formulation of a plan that the members of the American Chemical Society, the American Institute of Chemical Engineers and the American Institute of Chemists could collectively support. Certainly the time is ripe for united action. A house divided is but a house of cards and an easy prey for outsiders to take over.

We honestly believe that the overwhelming majority of chemists and chemical engineers firmly believe that their best interests lie in the maintenance of a professional standing, rather than in the possession of a union card but in the final analysis the chemists themselves should and will make the ultimate decision one way or another.

In arriving at that decision, however, they should bear in mind that in accepting a union card they effectively bar themselves from any voice in management and close the door to personal advancement. It is also well to remember that in any sort of union set up minimum salaries tend to become maximum salaries.

Our labor laws being what they are there is, however, real danger that many may be coerced into a step that they do not fundamentally approve of and it is little help to the individual chemist to suggest in this day and age as does *Industrial and Engineering Chemistry* editorially that "The most courageous and effective thing would be to resign his job in preference to accepting such stipulations imposed by the union as a condition to continued employment."

No professional group allied to the chemical industry has the legal authority to say what is or what is not a full-fledged chemist or engineer. They can, of course, promulgate any requirements of membership in their own organizations they wish to, but no unionizing group proselytizing to gain members need pay the slightest attention to such pronouncements and probably in practice will not.

Now is the time for all professional engineering and scientific groups to organize and to determine a sound, constructive, progressive, forward-looking policy and to place the full weight of all professional groups behind such a program.

Booklets & Catalogs

Chemicals

A335. Carbon Black in Reclaim Bearing Tread Stock; Report of a study conducted to determine the electrical conductivities of four grades of Spheron (carbon black) in high grade tire tread stocks containing some reclaimed rubber and also to determine the stress strain and abrasion resistance properties which they impart. Godfrey L. Cabot, Inc.

A336. Glycerine Facts; Sept., 1941. Mimeographed sheets containing information and useful formulas using glycerine. Glycerine Producers' Association.

A337. Dyestuffs; Sept., 1941. Booklet containing the following short articles; Contributions from Turkish Archives to the History of Dyeing, Hand Block Printing, Problems in Dyeing Rayon Mixtures, Men's and Women's Shoe and Leather Colors for Spring, 1942, Dyestuffs in Warfare. Dyeing Cotton, Linen and Wool Goods with Indigo (concluded from June issue). National Aniline & Chemical Co., Inc.

A338. Lustron; Booklet describes the manufacture, molding and uses of Lustron, a polystyrene molding compound. Also gives properties in several tables and charts. Contains many attractive illustrations. Monsanto Chemical Co.

A339. Metallic Soaps; An extensive 57 page book compiled especially for technical men engaged in either pure or industrial research. Contains in convenient form data on the standard, well known metallic soaps, as well as some not so commonly known. The book is divided into the following sections. Metallic Soaps in Common Use, Metallic Soaps Less Commonly Used, Metallic Soaps in Industry, Metasap Specialties, Analysis of Metallic Soaps, Bibliography, Patent Literature. Metasap Chemical Co., Inc.

A340. Price Schedule; Sept. 20, 1941. Revised prices of synthetic and processed natural resins are given. Stroock & Wittenberg Corp.

A341. Properties of Ameripol D; 8-page, illustrated catalog gives extensive supply of information on the properties of Ameripol (synthetic rubber). The B. F. Goodrich Co.

Equipment—Containers

E542. Electromet Review; 1941. 4-page folder describes and illustrates some important applications of stainless steels. Electro Metallurgical Co.

E543. Equipment and Complete Plants for the Process Industries; Contains review of the company's scope and facilities in this field, but is primarily devoted to descriptions and illustrations of recently developed items of chemical process equipment. Handling and unloading plants for liquefied gases are described and attention is drawn to the facilities of the company for the manufacture of high pressure-high temperature piping. Blaw-Knox Co.

E544. Facts About Towmotor; Descriptions, illustrations and operating data for line of industrial trucks. Towmotor Co.

(*Continued on page 528*)

Chemical Industries
522 5th Avenue
New York City

I would like to receive the following booklets:

....

....

Name ....

Title ....

Company ....

Address ....

All information requested above *must* be given to receive attention.

BOOKLETS AND CATALOGS

(*Continued from page 526*)

E545. Furnace Draft; Publication No. 41-472, 20-page booklet tells what draft is, where it is found, how it is measured and why it is important. The Hays Corporation.

E546. Intensive Mixers; 36-page catalog describing and illustrating line of mulling type mixers for dry materials. National Engineering Co.

E547. Link-Belt News; Sept., 1941. Eight pages of news devoted to the application of materials handling and power transmitting machinery. Link-Belt Co.

E548. Multi-Wash Collectors; Bulletin No. 110. 16-page booklet describes, illustrates and gives engineering data and specifications for equipment designed to suppress collecting dust by washing the air free from all contamination. Claude B. Schneible Co.

E549. Nordstrom Valves; 104-page book presents complete line of valves. Each valve illustrated is accompanied by full specifications, range of sizes, dimensions, working and test pressures or A. S. A. ratings, method of operation and notes regarding flanges, templates, etc. Cross sectional views of the basic types are shown. In an accessory section, wrenches, adapters, locking devices, high and low head extensions, chain wheels, remote controls, cylinder units, gear housings and road boxes are presented. A newly revised table of lubricants is listed including several new compounds for special refinery service. Merco Nordstrom Valve Co.

E550. Technical Data Card 108A; Card folder gives chemical compositions of SAE steels reprinted from the 1941 SAE Handbook. The Babcock & Wilcox Tube Co.

E551. Texrope Sheaves; Booklet gives descriptions of Texsteel and Texdrive Sheaves, steel and cast iron sheaves for Texrope drives from fractional to 25 horsepower. Tables in book list available sizes, dimensions and prices. Allis-Chalmers Mfg. Co.

E552. The Laboratory; Vol. 12, No. 5. Interesting booklet contains short article on the birth of modern chemical nomenclature. Also numerous laboratory and plant hints. Fisher Scientific Co.

E553. Vibrometer; Booklet describes pocket-size vibrometer for use in detecting and measuring mechanical vibrations in motors, generators, and other rotating equipment. Westinghouse Electric and Manufacturing Co.

Index to Advertisers

"We"—Editorially Speaking

We introduce in this issue a new regular feature "Between the Lines," written by Kenneth Tator, industrial chemist and chemical engineer. In introducing this series we call to your attention that these commentaries on the raw materials situation are prepared by an experienced industrial chemist and hence treat this highly important and absorbing subject from an industrial chemical viewpoint, rather than the more usual standpoint of statistical economics. He will take you "behind the scenes, explaining the whys and wherefors, the intricate ramifications and inter-relationships involved." The accompanying specially prepared flowsheets will prove extremely informative. We are delighted to welcome Mr. Tator to the fold that includes R. W. Lahey (Packaging and Containers), T. N. Sandifer (Washington), T. E. R. Singer (Foreign Literature Digest), E. L. Luaces (foreign patents), and others—another step in a definite editorial policy to provide the readers of "C. I." with up-to-the-minute authoritative interpretations of the technological and economic news of the chemical world by a group of outstanding experts in their respective fields of endeavor. Mr. Tator received his B. A. from Reed College in '28, his master's degree from M. I. T. in '30. Between 1930 and '35 he was a research chemist and development engineer with Dewey & Almy Chemical and for the next five years was director of Container Sealing Research and Development for that company. He has been a consultant on industrial raw materials and processes for the past two years. He is a member of the A. I. Ch.E., the A. C. S., The Institute of Food Technologists and other technical societies.

The many readers who regularly peruse the U. S. and foreign patents in the Statistical Data Section have probably noted the change in style put into effect in the September issue. This new style and the new type face that goes with it were introduced to improve the readability and usefulness of this section. We think it does so quite well and would like to know what some of "C. I."'s regular readers think of it. Let us have your comments.

Page Doctor Parsons!

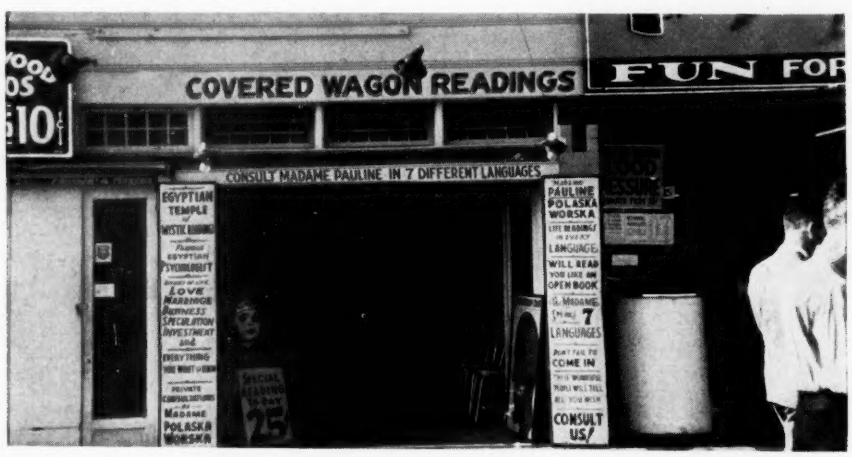
We were guilty last month of undertaking to assume the authority of handing out promotions in the Innis, Speiden organization. On the "Headliners In The News" page in the September issue (page 359) we listed Walter E. Baumeister as being now in charge of the Cleveland office. Mr. Baumeister, who comes to Cleveland from the Isco Chemical Division at Niagara Falls, N. Y., works under Donald S. Cushman, Cleveland District Manager. The new Cincinnati office in Carew Tower, directly in charge of Robert D. Kane, is also under the direction of Donald S. Cushman. The new Cincinnati office will serve the trade in Southern Ohio, Indiana and Kentucky and will be a sub branch of the Cleveland office. In the caption Mr. Kane's name should have read Robert instead of Walter. Our sincere apologies to all concerned.

When advertising managers go scientific:

"We Photographed the Love Life of Rubber Molecules and Discovered How to Make Tires Tougher"—Goodyear Tire & Rubber.

"Give Us An Advertising Faraday"—The Mirror, New York.

Congratulations of the Month—To the executives of the Texas Division of Dow Chemical for the efficient manner (personal observation by "We") in which some 4,200 employees and their families were moved into Houston when the recent hurricane threatened the Freeport plant. A plant manager is certainly a many-sided individual.



According to reports from the Atlantic City Meeting of the American Chemical Society chemical consumers deserted the meetings at the Auditorium in droves to consult Madame Pauline on the ways and means of getting an extra car of chlorine, a few drums of this and a barrel of that.

State of Chemical Trade

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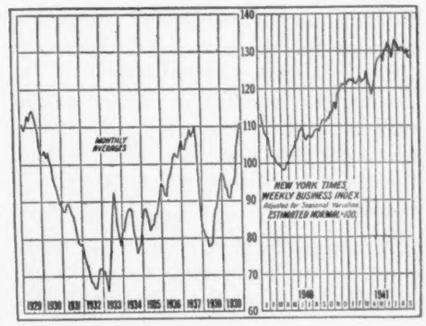
WEEKLY STATISTICS OF BUSINESS

Week Ending	Carloadings 1941	Carloadings 1940	Carloadings % of Change	Electrical Output† 1941	Electrical Output† 1940	Electrical Output† % of Change	Jour. of Com. Price Index	*Nat'l Fertilizer Ass'n Chem. & Drugs	*Nat'l Fertilizer Ass'n Fats & Oils	*Nat'l Fertilizer Ass'n Fert. Mat.	Price Indices Mixed Fert.	Price Indices All Groups	†Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher Commodity Index
Aug. 30......	912,720	768,775	+18.7	3,223,609	2,736,224	+17.8	94.9	106.3	122.0	112.7	107.1	115.3	85.9	96.5	130.5	97.7
Sept. 6......	797,740	695,094	+14.6	3,095,746	2,591,957	+19.4	95.8	106.3	125.5	112.7	107.1	115.8	86.0	96.3	129.3	97.9
Sept. 13......	913,952	804,265	+13.6	3,281,290	2,773,177	+18.3	95.8	107.5	130.6	113.6	107.1	116.8	87.3	96.9	130.2	98.4
Sept. 20.......	907,969	813,329	+11.6	3,232,192	2,769,346	+16.7	95.1	107.6	129.3	114.2	107.1	116.7	87.8	96.1	128.3	98.5

MONTHLY STATISTICS

CHEMICAL:	August 1941	August 1940	July 1941	July 1940	June 1941	June 1940
Acid, sulfuric **(expressed as 50° Baumé, short tons, Bureau of the Census)**						
Total prod. by fert. mfrs.	......	......	202,597	180,553	208,884	176,846
Consumpt. in mfr. fert.	......	......	175,186	162,334	162,334	137,321
Stocks end of month	......	......	75,350	94,628	77,545	90,971
Alcohol, Industrial (Bureau Internal Revenue)						
Ethyl alcohol prod., proof gal..	......	......	......	......	32,223,500	21,422,583
Comp. denat. prod., wine gal...	......	......	......	......	964,701	510,665
Removed, wine gal.	......	......	......	......	982,849	469,216
Stocks end of mo., wine gal...	......	......	......	......	441,151	498,982
Spec. denat. prod., wine gal. ...	......	......	......	......	14,422,185	9,195,976
Removed, wine gal.	......	......	......	......	14,630,687	9,155,505
Stocks end of mo., wine gal...	......	......	......	......	653,416	1,163,490
Ammonia sulfate prod., tons *a*..	62,418	62,344	62,580	......	61,391.6	61,494.9
Benzol prod., gal. *b*	3,812,511	11,357,000	3,533,818	11,727,000	11,562,800	11,075,000
Byproduct coke, prod., tons *a*..	5,012,979	4,695,500	5,013,656	4,612,091	4,836,035	4,387,200
Cellulose Plastic Products (Bureau of the Census)						
Nitrocellulose sheets, prod., lbs.	973,085	610,140	851,752	680,067	913,725	535,226
Sheets, ship., lbs.	1,025,638	670,897	895,069	679,766	988,185	587,953
Rods, prod., lbs.	315,778	208,565	291,167	156,643	332,433	169,922
Rods, ship., lbs.	339,597	246,200	330,943	210,930	363,191	203,560
Tubes, prod., lbs.	148,280	71,455	166,022	62,413	140,482	64,756
Tubes, ship., lbs.	145,070	52,445	127,116	64,158	124,067	58,538
Cellulose acetate, sheets, rod, tubes						
Production, lbs.	572,675	772,928	507,081	564,729	512,506	633,808
Shipments, lbs.	579,695	783,686	541,039	407,830	523,438	562,223
Molding comp., ship.; lbs. ...	2,506,393	1,341,994	2,346,469	777,367	2,264,470	682,095
Methanol (Bureau of the Census)						
Production, crude, gals.	450,107	407,764	417,377	390,004	436,124	425,578
Production, synthetic, gals.	5,005,840	3,787,794	4,724,688	3,852,669	4,662,744	3,426,100
Pyroxylin-Coated Textiles (Bureau of the Census)						
Light goods, ship., linear yds...	4,297,069	2,833,467	4,416,772	2,413,798	4,170,383	2,236,151
Heavy goods, ship., linear yds..	3,132,999	2,519,383	3,075,946	2,016,516	2,968,087	1,794,124
Pyroxylin spreads, lbs. *c*	6,886,395	5,366,381	6,472,685	4,435,473	7,151,433	3,931,148
Exports (Bureau of Foreign & Dom. Commerce)						
Chemicals and related prod. *d*..	......	......	......	......	$19,342	$23,286
Crude sulfur *d*	......	......	......	......	$1,388	$984
Coal-tar chemicals *d*	......	......	......	......	$2,196	$1,840
Industrial chemicals *d*	......	......	......	......	$4,213	$4,303
Imports						
Chemicals and related prod. *d*..	......	......	......	......	$5,048	$3,745
Coal-tar chemicals *d*	......	......	......	......	$927	$542
Industrial chemicals *d*	......	......	......	.....	$1,332	$696
Employment **(U. S. Dept. of Labor, 3 year av., 1923-25 = 100)** Adjusted to 1937 Census Totals						
Chemicals and allied prod., including petroleum	141.2	119.4	137.8	118.5	135.8	119.0
Other than petroleum	144.4	118.6	140.4	117.4	138.3	118.0
Chemicals	180.4	141.6	176.0	140.4	172,1	138.3
Explosives	Not Available		Not Available		......	......
Payrolls **(U. S. Dept. of Labor, 3 year av., 1923-25 = 100)** Adjusted to 1937 Census Totals						
Chemicals and allied prod., including petroleum	178.5	134.4	173.6	133.0	171.1	133.2
Other than petroleum	184.7	133.5	178.6	131.9	175.5	132.0
Chemicals	246.8	169.3	239.6	167.2	232.6	165.2
Explosives	Not Available		Not Available		......	......
Price index chemicals*	......	......	......	......	87.2	85.1
Drugs & Pharmaceuticals* ...	......	......	......	......	99.9	82.2
Fert. mat.*	......	......	......	......	69.9	67.4
Paint and paint mat.	......	......	......	......	90.3	85.2
FERTILIZER:						
Exports **(long tons, Nat. Fert. Association)**						
Fertilizer and fert. materials ...	......	......	......	......	66,651	90.061
Total phosphate rock	......	......	......	......	42,540	47,545
Total potash fertilizers	......	......	......	......	4,319	1,303
Imports **(long tons, Nat. Fert. Association)**						
Fertilizer and fert. materials ...	......	......	......	......	64,416	99,213
Sodium nitrate	......	......	......	......	22,412	62,598
Total potash fertilizer	......	......	......	......	7,417	10.349

INDUSTRIAL TRENDS



Business: There were some indications during the past month that business gains are becoming limited. For August and the first part of September, the Federal Reserve Board reports slightly increased industrial activity. The Board's index increased from 160 in July to 161 in August. The "New York Times" index of business activity dropped from 130.5 for week ending August 30 to 128.2 for week ending September 27. It seems evident that raw material supplies, particularly metals, cannot continue to maintain an acceleration in output comparable to the past year.

Steel: Production of steel remained at near capacity levels during the past month. The week of October 6 saw the largest production of steel, on a tonnage basis, in the history of the industry. At an operating rate of about 98.1%, 1,621,000 tons were produced. The previous record was 1,613,000 reached in the weeks of May 19 and July 28 of this year.

The S. P. A. B. approved plans to increase capacity by 10,000,000 tons after studying a report by W. H. Hauck, O. P. M. consultant.

In spite of the recent high level of production and plans for increased capacity, it seems likely that there will soon be a drop in production. Reasons for this are shortage in steel scrap and strikes in the coal industry which are seriously cutting down on the supply of this vital raw material.

Carloadings: Railroad freight car loadings continue at high levels. A new mark for the current year was established in week ended September 27th with total of 919,510. This represented an increase of 1.3% over the previous

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week and was less than seasonal due to lagging movement of miscellaneous freight and declines in grain products.

For the first four weeks of September loadings averaged about 13% over corresponding period of 1940.

Automotive: After switching into new model production, the industry has gradually increased its output. However production will remain very much below last year. The O. P. M. is limiting output to 204,848 passenger vehicles for the month of December. This is a reduction of 48.4%. The automotive industry is rapidly taking over or making plans to take over at least one-third of the huge airplane building program as well as other armament production.

Electric Output: Electric energy produced during August for public use totaled 14,310,191,000 kilowatt hours, the highest production ever reported an increase of 17.3% over production in August, 1940.

Construction: Value of contract awards increased sharply in August and was about four-fifths larger than a year ago, according to F. W. Dodge Corp. All general types of construction shared in the gains with publicly financed projects being the most pronounced. Awards for residential building continued to advance.

Retail Trade: According to the Federal Reserve Board, sales of general merchandise rose sharply in August and were at extremely high level for that time of year. The Board's adjusted index of department store sales advanced to 133% of the 1923-25 average as compared with 115 in July and an average of 103 in first half of this year.

Commodity Prices: Prices of most commodities continued to advance from August to middle of September. Grains, other foodstuffs, and cotton showed large increases. A number of industrial commodities not covered by federal price ceilings also showed increases.

Outlook: It is not likely that industrial production will expand to any considerable extent in the next month or so. In fact there may be some curtailment due to the more stringent bearing of priorities on non-defense industries. This channeling of raw materials is also expected to work hardships on small businesses and cause dislocations of labor and may bring considerable temporary unemployment. The industries contributing directly to the armament program should benefit from the stricter application of priorities and continue at their high rates provided labor disputes can be kept in control.

MONTHLY STATISTICS (cont'd)

FERTILIZER: (Cont'd)	August 1941	August 1940	July 1941	July 1940	June 1941	June 1940
Superphosphate e (Nat. Fert. Association)						
Production, total	......	......	317,712	271,877	307,907	272,235
Shipments, total	......	......	173,000	158,944	272,209	199,784
Northern area	......	......	95,247	101,421	156,903	125,893
Southern area	......	......	77,753	57,523	115,306	73,891
Stocks, end of month, total	......	......	1,137,459	1,202,334	937,869	1,051,092
Tag Sales (short tons, Nat. Fert. Association)						
Total, 17 states	180,385	161,333	68,239	39,800	143,548	148,990
Total, 12 southern	71,610	60,782	58,009	32,329	103,774	121,557
Total, 5 midwest	108,775	100,851	10,230	7,471	39,774	27,433
Fertilizer employment *i*	......	......	88.5	79.8	92,5	88.5
Fertilizer payrolls *i*	......	......	87.0	69.7	93.7	78.4
Value imports, fert. and mat. *d*	......	......	......	......	$1,609	$2,119
GENERAL:						
Acceptances outst'd'g *f*	$197	$181	$209	$188	$212	$206
Coal prod., anthracite, tons	......	......	4,623,000	4,534,000	4,891,000	4,492,000
Coal prod., bituminous, tons	......	......	43,300,000	35,890,000	42,774,000	32,400,000
Com. paper outst'd'g *f*	$353	$244	$330	$232	$299	$224
Failures, Dun & Bradstreet	954	1,128	908	1,175	970	1,114
Factory payrolls *i*	157.0	105.5	152.5	98.2	152,1	99.5
Factory employment *i*	132.7	107.4	133.2	103.2	127.8	103.1
Merchandise imports *d*	......	......	$279,536	$329,776	$279,536	$211,390
Merchandise exports *d*	......	......	$211,390	$317,015	$337,745	$349,728
GENERAL MANUFACTURING:						
Automotive production	147,600	75,873	444,241	231,703	520,521	344,636
Boot and Shoe prod., pairs	44,763,941	39,603,443	44,353,063	34,012,164	39,726,391	28,121,118
Bldg. contracts, Dodge *j*	......	......	$577,392	$398,673	$539,106	$324,000
Newsprint prod., U. S. tons	83,592	86,633	83,199	82,579	83,962	84,762
Newsprint prod., Canada, tons.	293,054	316,607	293,483	332,689	273,697	315,343
Glass containers, gross‡	......	......	......	......	6,166	4,429
Plate glass prod., sq. ft.	......	......	......	......	18,533,500	9,783,100
Window glass prod., boxes	......	......	......	......	1,304,200	907,900
Steel ingot prod., tons	......	......	6,821,682	5,724,625	6,800,730	5,657,000
% steel capacity	......	......	95.6	83.0	98.2	84.5
Pig iron prod., tons	......	......	4,770,778	4,053,945	4,553,165	3,818,897
U.S. cons'pt. crude rub., lg. tons	55,365	53,307	68,653	47,001	84,912	47,834
Tire shipments	5,399,702	4,782,678	6,455,803	5,920,072	7,601,993	6,908,434
Tire production	5,004,912	4,443,918	5,603,064	5,287,883	6,378,844	6,263,876
Tire inventories	5,834,109	6,071,075	6,234,749	6,356,726	7,087,737	7,010,100
Cotton consumpt., bales	......	......	928,943	622,723	875,137	565,416
Cotton spindles oper.	23,029,066	22,084,474	23,027,818	21,916,700	22,991,546	21,942,748
Silk deliveries, bales	2,069	30,189	28,328	20,117	23,751	17,307
Wool consumption *s*	......	......	53.3	31.2	55.7	25.7
Rayon deliv., lbs.	37,300,000	34,000,000	39,400,000	32,100,000	38,300,000	31,400,000
Rayon employment *i*	329.3	307.7	327.1	306.9	327.0	306.0
Rayon payrolls *i*	368.2	318.0	367.0	314.7	362.4	314.4
Soap employment *i*	102.7	83.6	96.2	81.3	93,3	81.5
Soap payrolls *i*	144.4	101.8	135,1	99.9	129.0	100.4
Paper and pulp employment *i*	127.9	116.9	126.1	117.1	124.6	116.2
Paper and pulp payrolls *i*	163.4	124.8	157.1	126.3	157.7	126.2
Leather employment *i*	94.7	80.3	95.3	80.1	93.9	80.1
Leather payrolls *i*	109.4	77.0	108.7	76.0	106.6	75.7
Glass employment *i*	131.0	106.9	128.8	103.3	125.4	104.9
Glass payrolls *i*	155.6	116.0	149.7	105.2	153,3	111.0
Rubber prod. employment *i*	111.7	85.9	111.4	83.5	110.7	83.4
Rubber prod. payrolls *i*	138.1	87.7	135.4	85.2	141.1	86.4
Dyeing and fin. employment *i*	136.3	121.5	139.6	116.1	139.3	115.7
Dyeing and fin. payrolls *i*	132.4	101.8	134.5	95.0	133.2	93.0
MISCELLANEOUS:						
Oils & Fats Index ('26 = 100)[1]	......	......	134.3	53.4	128.0	53.1
Gasoline prod., *p*	.....	......	56,987	51,325	56,987	51,325
Cottonseed oil consumpt., bbls.	225,770	292,553	316,336	263,990	323,316	245,442
PAINT, VARNISH, LACQUER, FILLERS:						
Sales 680 establishments, dollars	$48,646,514	$36,441,511	$48,950,308	$35,553,580	$54,336,429	$37,897,861
Trade sales (580 estbts.) dollars	$23,893,291	$19,303,935	$24,274,619	$19,573,840	$28,049,452	$21,718,413
Industrial sales, total, dollars	$20,246,764	$13,651,210	$20,132,508	$12,732,233	$21,022,220	$12,582,231
Paint & Varnish, employ. *i*	144.4	123.5	145.9	124.6	144.8	126.4
Paint & Varnish, payrolls *i*	171.3	132.1	174.1	133.4	177.8	136.2

a Bureau of Mines; *b* Crude and refined plus motor benzol, Bureau of Mines; *c* Based on 1 lb. of gun cotton to 7 lbs. of solvent, making an 8-lb. jelly; *d* 000 omitted, Bureau of Foreign & Domestic Commerce; *e* Expressed in equivalent tons of 16% A.P.A.; *f* 000,000 omitted at end of month; *i* U. S. Dept. of Labor, 3 year average, 1923-25 = 100, adjusted to 1937 Census totals; *j* 000 omitted. 37 states; *p* Thousands of barrels, 42 gallons each; *q* 680 establishments, Bureau of the Census; *r* Classified sales, 580 establishments, Bureau of the Census; *s* 53 manufacturers, Bureau of the Census, in millions of lbs.; *t* 387 identical manufacturers, Bureau of the Census, quantity expressed in dozen pairs; *v* In thousands of bbls., Bureau of the Census; ** Indices, Survey of Current Business, U. S. Dept. of Commerce; *z* Units are millions of lbs.; ‡ 000 omitted; * New series beginning March, 1940; [1] Revised series beginning February, 1940.

Davison Chemical Nets $652,311

Davison Chemical Corp. and subsidiaries in report for fiscal year ended June 30, 1941, certified by independent auditors, show net profit of $652,311 after depreciation, interest, amortization, provisions of $129,035 for federal income taxes and other charges, equal to $1.26 a share (par $1) on 514,134 shares of capital stock.

Provision for income taxes, the company states, is approximately $73,000 less than the amount which would have been required had not certain losses been sustained during the year on disposal of assets, which losses are not reflected in the foregoing statement as they were provided for in prior years.

In preceding year the net loss was $135,431 after charges and taxes.

du Pont Nets $1.98 for Quarter

E. I. du Pont de Nemours & Co. and wholly-owned subsidiaries in report for quarter ended June 30, 1941, subject to year-end adjustments, show net profit of $23,007,636 after depreciation, obsolescence, federal income taxes based on law existing at June 30, last, provision of $10,566,000 for excess profits tax and a $6,500,000 provision for contingencies, including allowance for unknown taxes, comparing with net profits of $23,126,507 in June quarter of previous year and $20,754,161 for quarter ended March 31, 1941.

After deducting dividends on preferred stock and including $810,774 company's equity in undivided profits of controlled companies not wholly-owned, there was a balance available for common stock in June quarter of 1941 of $21,918,453 equivalent to $1.98 a share (par $20) on 11,050,987 average number of common shares outstanding during the period.

In June quarter of previous year balance for common stock, including $1,122,329 company's equity in undivided profits of controlled companies, was $22,348,879, equal to $2.02 a share on 11,043,213 average common shares and in quarter ended March 31, 1941 balance for common stock, including $702,773 equity in undivided profits of controlled companies, was $19,556,978 equal to $1.77 a share on 11,050,570 average common shares.

Earnings Statements Summarized

Company	Annual dividends	Net income 1941	Net income 1940	Common share earnings 1941	Common share earnings 1940	Surplus after dividends 1941	Surplus after dividends 1940
Aluminum Industries, Inc.:							
Six months, June 30 ..	y$ .60	$ 121,849	$ 71,708	$1.22	$ .72	......	......
Bell Telephone of Pennsylvania:							
Eight months, August 31	8.00	8,741,150	7,987,382	....	....	......	......
Celotex Corp.:							
July 31 quarter	y .87½	447,468	422,855	h.64	h.61	......	......
Nine months, July 31 ..	y .87½	1,208,704	305,458	h1.72	h.31	......	......
Dow Chemical Co.:							
August 31 quarter	y 3.00	2,104,282	2,104,946	h1.79	h1.96	......	......
Harris-Seybold-Potter Co.:							
Year, June 30	w .25	402,683	250,535	2.37	1.18	......	......
International Agricultural Corp.:							
Year, June 30	f ...	402,522	14,007	p4.02	p.14	......	......
Masonite Corp.:							
Twelve weeks, August 31	y 1.50	830,801	629,851	1.59	1.13	......	......
nYear, August 31	y 1.50	2,010,886	1,659,348	3.54	2.91	......	......
McKesson & Robbins, Inc.:							
Six months, June 30 ...	f ...	1,988,792	......	....	....	......	......
U. S. Smelt., Ref. & Mng.:							
Eight months, August 31	y 5.50	2,806,630	3,204,017	3,24	3.99	......	. . . .
United States Smelting, Refining & Mining Co.:							
Eight months, August 31	y 5.50	2,806,630	3,204,017	3.24	3.99	......	......
Vanadium-Alloys Steel Co.:							
Year, June 30	y 4.25	906,620	855,210	4.56	4,29	......	......
Westinghouse Elec. & Mfg. Co.:							
Eight months, August 31	y 5.00	14,300,238	13,207,146	5.35	4.94	......	......

a On Class A shares; *b* On Class B shares; *c* On Combined Class A and Class B shares; *d* Deficit. *f* No common dividend; *j* On average number of shares; *k* For the year 1940; *b* On Preferred stock; On Class A shares; *y* Amount paid or payable in 12 months to and including the payable date of the most recent dividend announcement; ‡ Indicated quarterly earnings as shown by comparison of company's reports for the 6 and 9 months periods; § Plus extras; *n* Preliminary statement; *h* On shares outstanding at close of respective periods. ** Indicated quarterly earnings as shown by comparison of company's reports for 1st quarter of fiscal year and the six months period. ‡‡ Indicated earnings as compiled from quarterly reports. † Net loss. * Not available. ¶¶ Before interest on income notes. *x* Paid on or declared in last 12 months plus extra stock. *w* Last dividend declared, period not announced by company.

Price Trend of Representative Chemical Company Stocks

	Aug. 30	Sept. 6	Sept. 13	Sept. 20	Sept. 27	Net gain or less last mo.	Price on Sept. 30 1940	1941 High	1941 Low
Air Reduction Co.	42⅞	43	42¾	42	41¾	— 1⅛	65¾	45	35¾
Allied Chemical & Dye	162½	160¾	163	161⅝	160	— 2½	187	167½	144½
Amer. Agric. Chem.	18¾	18¾	18¾	18⅞	18⅛	— ⅝	22	19⅝	14⅜
Amer. Cyanamid "B"	41⅜	40½	41⅛	41¾	40½	— ⅞	33½	42⅜	31
Columbian Carbon	80½	80	79¾	80	80	— ½	90	83	69⅞
Commercial Solvents	11⅛	11⅛	11	10⅝	10¼	— ⅞	14	11⅞	8⅜
Dow Chemical Co.	131¾	129	128	124	114	—17¾	138½	141¾	120
du Pont	155⅞	155¾	152½	151⅛	151	— 4⅞	184¼	164¾	138
Hercules Powder	74	73	72½	72	69½	— 4½	89½	80¼	66
Monsanto	91¾	91½	92½	94	92⅞	+ 1⅛	33⅞	94	77
Standard Oil of N. J.	43¾	42⅝	43	42¾	42	— 1¾	108¼	45⅜	33
Texas Gulf Sulphur	37⅞	38⅜	38¾	38	36¾	— 1⅛	48¾	38⅞	31½
Union Carbide & Carbon ...	78¾	78½	78½	79⅛	76½	— 2¼	36⅞	79⅞	60
United Carbon Co.	52	51¾	51¾	51⅛	50½	— 1½	91½	52	90⅞
U. S. Industrial Alcohol	33¾	32⅝	32	30¾	29½	— 4¼	25½	33½	20

Dividends and Dates

Name	Per Share	Payable	Stock Record
American Potash & Chemical Corp. (irreg.)	$ .50	Sept. 29	Sept. 26
Climax Molybdenum Company	.30	Sept. 30	Sept. 22
Commercial Alcohols, Ltd. 8% pref. (quar.)	.10	Oct. 15	Oct. 1
Corn Products Refining Co. com. (quar.)	.75	Oct. 20	Oct. 3
7% pref. (quar)	1.75	Oct. 15	Oct. 3
Dominion Tar & Chemical Co. Ltd. 5½% pref. (quar.)	1.375	Nov. 1	Oct. 14
7% pref. (quar.)	1.75	Oct. 15	Sept. 30
Dow Chemical Co. com.	.75	Nov. 15	Nov. 1
5% pref. (quar.)	1.25	Nov. 15	Nov. 1
Harris-Seybold-Potter Co. $5 pref. (quar.)	1.25	Oct. 1	Sept. 20
Harshaw Chemical Co. (quar.) ..	3.75	Sept. 30	Sept. 15
Extra	.50	Sept. 30	Sept. 15
Monsanto Chemical Co. $4.50 pref. A (semi annual)	2.25	Dec. 1	Nov. 10
$4.50 pref. B (semi annual)	2.25	Dec. 1	Nov. 10
$4.00 pref. C (semi annual)	2.00	Dec. 1	Nov. 10
U. S. Industrial Alcohol Co. (quar.)	.25	Nov. 1	Oct. 15
Extra	25	Nov. 1	Oct. 15
U. S. Potash Co. (irreg.)	1.25	Sept. 29	Sept. 15
U. S. Smelting, Refining & Mining Co. com.	1.00	Oct. 15	Oct. 2
pref. 7% (quar.)	.875	Oct. 15	Oct. 2
Union Carbide & Carbon Corp. ..	.75	Oct. 1	Sept. 5
United Carbon Co.	.75	Oct. 1	Sept. 13
Victor Chemical Works (irreg.)	.35	Sept. 30	Sept. 20
Westvaco Chlorine Prods. Corp. com. (quar.)..	.35	Nov. 1	Oct. 10
$4.50 pref. (quar.)	1.125	Nov. 1	Oct. 10

Carbide & Carbon Earnings Increase

Union Carbide & Carbon Corp. and subsidiaries report for quarter ended June 30, 1941, net profit of $10,796,498 after interest, depreciation, and provision for increased federal income and excess profits taxes, equal to $1.16 a share on 9,277,788 no-par shares of capital stock. This compares with $9,503,469 or $1.02 a share in June quarter of previous year and $10,545,635 or $1.14 a share for quarter ended March 31, 1941.

Hercules Powder's Income Up

Hercules Powder Co. reports earnings for the second quarter of this year of $1,470,763, after setting aside $2,697,303 for estimated federal taxes for the period. These earnings are equal after preferred dividends to $1.02 a share on 1,316,710 shares of common stock and compares with a net profit of $1,360,426, equal to 93 cents a share in March quarter.

For the six months ended June 30, net earnings were $2,831,189, equal to $1.95 a share after estimated federal taxes of $4,715,742, which includes $850,000 as a provision for expected higher tax rates.

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Chemical Stocks and Bonds

Price Range: September 1941 Last	September 1941 High	September 1941 Low	1940 High	1940 Low	1939 High	1939 Low	Sales: Number of shares September 1941	Sales: Number of shares 1941	Stocks	Par $	Shares Listed	Dividends 1940*	Earnings** $-per-share-$ 1940	1939	1938
NEW YORK STOCK EXCHANGE															
54	55¾	46	70¼	49¼	71½	53	2,200	23,100	Abbott Labs.	No	755,204	2.15	2.89	2.61	2.43
41½	45	35¾	58⅛	36½	68	45⅛	21,600	214,000	Air Reduction	No	2,711,137	1.75	2.38	1.98	1.47
161	167½	144½	182	135½	200½	151½	4,400	62,000	Allied Chem & Dye	No	2,401,288	6.00	9.43	9.50	5.92
19⅛	19⅝	14⅜	21	12⅛	24½	16	6,400	53,200	Amer. Agric. Chem.	No	627,981	1.20	1.45	1.22	2.23
8⅝	9⅞	4⅝	8¼	4⅛	11⅞	5½	9,200	62,800	Amer. Com. Alcohol	No	280,934	...	.22	—.38	—2.05
32¾	33⅞	26	35½	23	37	21	2,700	15,100	Archer-Dan.-Midland	No	545,416	1.40	5.71	3.82	.43
68	72¼	61	80½	57	71	50	800	9,100	Atlas Powder Co.	No	252,278	4.25	5.71	3,82	2.69
118½	118½	111	124¾	112½	127	116	20	2,020	5% conv. cum. pfd.	100	68,597	5.00	26.01	18.94	14.77
25¼	29¾	18⅞	35½	20	30¼	13⅝	15,300	171,400	Celanese Corp. Amer.	No	1,112,788	1.25	3.38	3.53	.20
121	122	116¾	121	105½	109⅞	84	750	13,290	prior pfd.	100	164,818	7.00	38,69	38.67	15.05
14½	16¼	11⅛	20	10⅛	18	11½	17,200	127,600	Colgate-Palm.-Peet	No	1,962,087	1.00	1.72	2.74	1.77
81	83	69⅞	98¾	71	96	73	2,300	17,500	Columbian Carbon	No	537,406	4.60	5.71	5.32	5.13
10½	11⅞	8⅜	16⅝	8	16	8⅝	33,800	302,000	Commercial Solvents	No	2,636,878	.25	.91	.61	—.11
53	53½	42¼	65½	40¼	67½	54⅞	15,700	131,300	Corn Products	25	2,530,000	3.00	3.10	3.32	3.18
177	182½	170	184	165	177	150	710	6,200	7% cum. pfd.	100	245,738	7.00	38.99	41.18	30.69
18⅝	20¼	13	23¼	12½	32⅝	18	2,920	22.590	Devoe & Rayn. A.	No	95,000	.25	1.14	2.08	—1.72
112¾	141¾	111⅛	171	127¼	144⅝	101½	9,900	37,800	Dow Chemical	No	1,135,187	3.00	6.65	3.76	3.91
152¼	164¾	138	189¼	146½	188½	126¼	33,800	221,400	DuPont de Nemours	20	11,065,762	7.00	7.23	7.70	3.74
125¾	126½	120⅞	129⅝	114	124⅛	112	1,500	20,450	4½% pfd.	No	1,688,850	4.50	51.48	52.25	87.27
143	145½	120¼	166¾	117	186⅛	138½	8,500	74,800	Eastman Kodak	No	2,488,242	6.00	7.96	8.55	7.54
177¼	182½	160	180	155	183½	155½	50	2,030	6% cum.	100	61,657	6.00	325.62	337.65	281.22
38½	41	32½	39¼	24¾	36	18¼	6,600	89,100	Freeport Sulphur	10	796,380	2.00	3.81	2.76	1.87
6⅝	7½	5⅞	10	5½	10⅞	7	2,400	39,100	Gen. Printing Ink	1	735,960	.60	.86	.94	.62
16½	17⅞	12¾	19⅝	11	24½	14	11,400	80,200	Glidden Co.	No	829,989	1.00	1.56	1.70	—.29
44	46	40¼	45	30	47	34	900	10,500	4½% cum. pfd.	50	199.940	2.25	8.64	9.27	1.03
94	96	76	113¼	89⅞	112¼	93	700	9,700	Hazel Atlas	25	434,409	5.00	5.98	6.60	4.97
69½	80¼	66	100½	69	101½	63	2,200	39,800	Hercules Powder	No	1,316,710	2.85	4.01	3.65	1.95
130⅝	131	123½	133½	120¼	135½	128½	340	2,810	6% cum. pfd.	100	96,194	6.00	66.38	60.87	35.31
26¾	29⅞	20¾	29	16⅝	29½	16¾	5,200	52,100	Industrial Rayon	No	759,325	2.00	3.15	1.77	.24
25	27	19½	47⅝	21¼	46¼	17½	5,300	23,100	Interchem.	No	290,320	1.60	2.47	4.10	.32
110½	113¼	107	113	91	109½	90	240	3,210	6% pfd.	100	65,661	6.00	16.99	24.27	7.39
1¾	2⅛	1¼	2½	1	3⅝	1½	2,300	37,300	Intern. Agricul.	No	436,048	...	—1.57	—1.32	—0.003
39	49	30⅛	44	18⅛	41	16	2,200	25,600	7% cum. pfd.	100	100,000	...	.14	1,26	7.01
29½	31⅜	23⅜	38⅞	19⅝	55¾	35	97,400	585,200	Intern. Nickel	No	14,584,025	2.00	2.30	2.39	2.09
48⅜	48½	38¼	39⅝	26⅞	38	29	500	9,700	Intern. Salt	No	240,000	2.50	3.98	1.92	2.29
20¾	22	17¾	23¾	14⅝	22½	14½	700	8,100	Kellogg (Spencer)	No	509,213	1.60	...	1.39	.71
29⅜	45⅜	26½	53⅜	30	56¾	36½	20,400	161,900	Libbey Owens Ford	No	2,513,258	3.50	3.97	3.21	1.57
15¾	16⅝	13	18⅝	10⅛	19	13½	6,200	47,900	Liquid Carbonic	No	700,000	1.00	1.72	1.62	1.81
29	31¼	24⅛	32¾	21	37⅝	20¾	5,300	37,600	Mathieson Alkali	No	828,171	1.50	1.72	1.12	1.01
92¼	94	77	119	79	114¾	85¾	6,100	59,300	Monsanto Chem.	No	1,241,816	3.00	4.04	3.81	2.35
117½	118½	112	119	110	121	110	150	2.280	4½% pfd. A.	No	50,000	4.50	57.38	54.29	31.51
120	123	115	122	113½	122½	112	70	2,440	4½% pfd. B.	No	50,000	4.50	57.38	54.29	31.51
17½	19¼	14½	22½	14⅛	27½	17⅞	14,000	151,700	National Lead	10	3,095,100	.87	1.34	1.23	.75
174	176	168½	176	160	173½	152	200	4,100	7% cum. "A" pfd.	100	213,793	7.00	28.54	27.04	20.03
142	154	142	153¾	132	145	132	180	2,140	6% cum. "B" pfd.	100	103,277	6.00	59.46	55.30	35.97
32¾	34¼	26	44	28⅝	46	28½	2,200	21,300	National Oil Products	4	179,829	1.35	3.92	3.89	2.23
9⅝	11⅞	5⅜	14¼	6⅛	17⅝	8½	12,700	142,900	Newport Industries	1	621,359	.30	.50	.66	—.08
47¾	50¾	38¾	64⅝	42	70	50	13,200	128,300	Owens-Illinois Glass	12.50	2,661,204	2.00	2.71	3.17	2.02
59	61½	50⅛	71¾	53	66	50⅝	11,700	134,400	Procter & Gamble	No	6,409,418	2.75	4.37	3.80	2.50
118	120	115	118½	112½	119¾	112	110	2,440	5% pfd.	100	169.517	5.00	336.78	298.55	101.81
14⅛	15¾	10⅛	13⅛	7⅝	17¼	9⅞	9,400	190.700	Shell Union Oil	No	13,070.625	.75	1.05	.77	.70
33½	33⅝	18⅞	23¼	12¼	29½	15½	10,600	105,500	Skelly Oil	No	981,349	1.25	3.28	1.99	2.27
32	34⅛	25½	29	20¾	30	22¾	41,600	531,900	S. O. Indiana	25	15.272.020	1.50	2.20	2.24	1.82
42⅛	45⅝	33	46½	29⅞	53½	38	87,800	1,089,400	S. O. New Jersey	25	27,278,666	1.75	4.54	3.27	2.86
8¾	9⅜	7⅜	9¼	4¼	9½	4	4,600	52,500	Tenn. Corp.	5	853.696	.25	1.36	.41	.40
40⅜	44¾	34½	47⅝	33	50¾	32½	44,200	484,400	Texas Corp.	25	10,876.882	2.00	2.90	3.02	2.13
36¾	38⅞	31½	37¼	26⅞	38½	26	11,800	121,900	Texas Gulf Sulphur	No	3,840.000	2.50	2.38	2.04	1.81
77¼	79⅞	60	88⅜	59⅞	94¼	65½	36,200	370,600	Union Carbide & Carbon	No	9,277,288	2.30	4.55	3.86	2.77
50¼	52	40⅞	65⅝	42½	69½	52	1,800	27,300	United Carbon	No	397.885	3.00	3.36	3.81	3.78
30¼	33½	20	28	14	29⅝	13½	14,200	98,500	U. S. Indus. Alcohol	No	391,238	...	2.73	1.06	—1.08
24⅞	34⅛	23	43⅞	25	40	16	6,900	117,400	Vanadium Corp. Amer.	No	425,708	1.50	2.85	3.25	.61
26½	27¼	20	31½	19	29⅝	18¼	2,200	16,600	Victor Chem.	5	696.000	1.40	1.45	1.59	1.05
1⅝	2½	1½	4⅛	1¾	5⅝	2½	3,200	24,500	Virginia-Caro. Chem.	No	486,122	...	—1.36	—1.57	—1.80
24½	28¾	19⅛	31¾	14	33¾	17	3,600	31,800	6% cum. part. pfd.	100	213.052	...	2.89	2.41	1.90
34½	36½	27¼	38½	27⅝	39¼	15¼	2,300	12,800	Westvaco Chlorine	No	353.152	1.85	2.96	2.91	1.52
111	112	105	109⅞	108	...	...	320	5,370	cum. pfd.	No	59,885	4.50	21.98	...	...
NEW YORK STOCK EXCHANGE															
40⅛	42⅝	31	39⅞	26	35¾	18⅝	22,500	231,600	Amer. Cyanamid "B"	10	2,618,387	1.10	2.44	2.07	.91
127	134	107	134⅞	98	112¾	76	500	11,950	Celanese, 7% cum. 1st pfd.	100	148.179	9.72	35.25	35.73	8.95
5⅛	6⅜	4	6¾	2⅝	6¾	3	400	12,925	Celluloid Corp.	15	194.952	...	—.29	.70	—2.73
6¾	7¾	6⅜	8⅛	5	9¼	5	600	9,900	Duval Texas Sulphur	No	500,000	.75	1.16	1.25	.71
93	99	65	92	60	68	30	900	5,925	Heyden Chem. Corp.	100	125,497	3.00	6.26	5.98	2.07
78	96¼	73	104	65	117	90	5,200	49,600	Pittsburgh Plate Glass	25	2,188,040	5.00	6.30	4.94	3.00
76	84	65	100	62½	113½	81	2,750	36,000	Sherwin Williams	25	638,927	3.00	6.57	5.96	2.43
112¾	115½	109	114¾	106	116	106½	440	2,750	5% cum. pfd.	50	122,289	5.00	39.49	35.08	8.76
PHILADELPHIA STOCK EXCHANGE															
185	185	162	192	158¾	179	135	375	2,350	Pennsylvania Salt	50	150,000	9.00	...	10.52	6.29

Price Range: September 1941 Last	September 1941 High	September 1941 Low	1940 High	1940 Low	1939 High	1939 Low	Sales September 1941	Sales 1941	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE													
102⅛	104½	100¾	105¼	100⅛	103¾	98	616,000	2,710,000	Amer. I. G. Chem. Conv.	1949	5½	M-N	$22,400,000
35	35¼	26⅛	41	27½	41½	19	29,000	349,000	Anglo Chilean Nitrate inc. deb.	1967	4½	J	10,400,000
32¾	33½	25⅝	39¾	27	37	21½	82,000	995,000	Lautaro Nitrate inc. deb.	1975	4	J-D	27,200,000
31	38	31	40	21	30	16	......	3,000	Ruhr Chem.	1948	6	A-O	1,500,000
98⅝	99¾	94¾	100¼	93½	95⅝	88⅝	335,000	3,813,000	Shell Union Oil	1954	2½	J-J	85,000,000
106¼	106½	103⅜	107	101⅛	106¼	97⅝	133,000	1,558,000	Standard Oil Co. (New Jersey) deb.	1961	3	J-D	85,000,000
105	105⅝	103	107	100⅝	106½	94¼	105,000	1,764,000	Standard Oil Co. (New Jersey) deb.	1953	2¾	J-J	50,000,000
106⅞	107	102⅞	108¼	102	105⅞	95¼	65,000	1,166,000	Texas Corp.	1959	3	A-O	40,000,000

* Including extras paid in cash.
** For either fiscal or calendar year.

Analysis of Miscellaneous Chemical Imports Through New York in 1940

The United States Tariff Commission has made a statistical analysis of certain general provisions or "basket clause" classifications of chemicals, dutiable under paragraph 5 of the Tariff Act of 1930, which were entered through the New York customs district in 1940. The purpose of this analysis is to segregate the most important miscellaneous chemicals and medicinals entered under this paragraph. The tabulation of the entries of these miscellaneous chemicals was made with the cooperation of the Work Projects Administration, and contains detailed information not available elsewhere.

Paragraph 5 of the Tariff Act of 1930 provides for a rate of duty of 25 per cent. ad valorem on all chemical elements, salts, compounds, and medicinal preparations, not especially provided for in other paragraphs. Imports under this paragraph are divided into forty-two classifications, the majority consisting of specifically named or closely related commodities. This analysis, however, deals only with the general provision or "basket clause" classifications listed in figure 1.

The total value of all imports under the classifications described above, in 1940 was $1,200,587, of which $1,026,428 was entered through the port of New York. The value of the imports analyzed was $604,455 or 59 per cent. of the imports in these classes through the New York customs district. The imports tabulated consist only of those items of the imports analyzed which were each valued at $1,000 or more. The total value of the items tabulated amounted to $543,651 or 90 per cent. of the total entries analyzed. This tabulation of miscellaneous chemical imports shows the quantity (if available) and value of each item, and its country of origin. Switzerland is the principal source of imports, supplying more than $500,000 in value of the total imports under these classifications, valued at $1,200,587. The United Kingdom was the second largest source, Germany the third, and France the fourth. Imports from Germany were valued at $120,000 in 1940, as compared with $769,000 in 1939, about one-fourth in 1940 being warehouse withdrawals and the remainder direct entries. Most of the entry papers of these imports from Germany are not as yet available and consequently imports of these items are not shown in the tabulation.

The most important commodities entered were 2-methyl-4-amino-5-thioformylaminomethyl pyrimidin (an intermediate used in the manufacture of Vitamin B_1), testosterone propionate, and Gynergen or

(*Continued on page 538*)

Figure 1

Class No.	Commodity description
226.28	Fatty alcohols and fatty acids sulfated, not elsewhere specified, and salts of fatty acids sulfated, not elsewhere specified
811.70	All alkaloids, salts and derivatives, not elsewhere specified
813.90	Medicinal preparations of vegetable origin (chrysarobin, papain, digitalin, and other active principles [except alkaloids])
813.95	Medicinal preparations of animal origin (oxgall, bile compounds, gland extracts, etc.)
8150.1	Medicinal and pharmaceutical preparations, not specially provided for, not containing alcohol
8150.6	Salts and compounds of gluconic acid and combinations and mixtures of any of the foregoing; digitalis glucosides; ergotamine tartrate, not specially provided for
8243.8	Ammonium compounds, not elsewhere specified
8245.9	Barium compounds, not elsewhere specified
8312.9	Magnesium salts and compounds, not specially provided for
8330.9	All potash salts, not specially provided for
835.60	Sodium compounds, not specially provided for
838.960	Chemical elements, compounds, mixtures, and salts, not specially provided for, not containing alcohol

Figure 2

General Imports through the New York Customs district of principal items in the basket classifications of paragraph 5, 1940
(Products valued over $1,000)

Commodity	Quantity	Value	Countries of origin (percent by value in parentheses)	
	Pounds			
Anhydrooxyprogesterone	....	$ 3,987	Switzerland (100)	
Atropine sulfate	219	8,359	Switzerland (97);	France (3)
Barium chlorate	11,200	1,071	France (100)	
Belladonna extract	1,000	3,766	United Kingdom (100)	
Carbaethoxy-17-oestradiol	....	3,088	Hungary (100)	
Carbromal powder	1,100	3,628	Switzerland (100)	
Cholic acid	304	1,237	Switzerland (88);	France (12)
Curare	15	1,665	Venezuela (100)	
Dehydrocholic acid	1,213	12,948	Switzerland (100)	
Desoxycorticosterone	....	19,672	Switzerland (100)	
Diacetone gulesonic acid	1,323	4,725	Switzerland (100)	
Digitalis glucosides	....	10,422	Switzerland (95);	France (5)
Dispersine B	2,205	1,488	Switzerland (100)	
Dispersing agent B. A.	6,614	3,931	Switzerland (100)	
Emetine hydrochloride	7	1,260	France (100)	
Ergobasin tartrate	....	5,440	Switzerland (100)	
Eserine	5	1,557	Switzerland (77);	France (23)
Estrogenic substance	....	14,500	Switzerland (100)	
Eucalyptol	8,000	4,256	Japan (100)	
Faral	23,399	7,365	Netherlands (100)	
Gonadotropes of urine hormone	....	3,648	France (100)	
Gynergen (ergotamine tartrate)	....	59,882	Switzerland (100)	
Kasenit No. 1	12,000	3,429	United Kingdom (100)	
Ketohydroxyoestrin	....	3,035	Belgium (100)	
Lipiodol	....	4,928	France (100)	
Magnesia San Pellegrino	....	14,600	Italy (52);	France (48)
Magnesium hydrate	8,000	1,159	United Kingdom (100)	
Magnesium trisilicate	104,500	28,029	United Kingdom (100)	
Medicinal inhalant	....	8,348	United Kingdom (100)	
2-methyl-4-amino-5-thioformyl-amino-methyl pyrimidin	506	101,013	Switzerland (100)	
Methyl testosterone	....	17,257	Switzerland (100)	
Nicotinic acid diethylamide	66	1,197	Hungary (100)	
Nucleinic acid	300	2,676	United Kingdom (100)	
Oestradiol	....	24,862	Switzerland (100)	
Oestradiol benzoate	....	5,681	Switzerland (70);	Belgium (30)
Oestradiol dipropionate	....	14,916	Switzerland (100)	

(*Continued on page 538*)

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ergotamine tartrate. These items, obtained chiefly from Switzerland were valued at $101,013; $60,295, and $50,882, respectively.

The rate of duty on imports of the chemicals and medicinals analyzed was 25 per cent. ad valorem except on salts and compounds of gluconic acid, digitalis glucosides, and ergotamine tartrate, which since the Swiss trade agreement, effective February 15, 1936 have borne a duty of 15 per cent. Besides the duty levied by the Act of 1930, some of the fatty alcohols, acids and salts thereof are subject to an import excise tax of 3 cents per pound on their content of inedible animal fats and greases under the Revenue Act of 1938.

Total United States imports of miscellaneous chemicals and medicinals under the classifications described declined in value from $2,571,000 in 1939 to only $1,200,000 in 1940. The decline was primarily due to the blockade by the British of Germany and other European countries under the control of the Axis powers.

Commodity	Quantity	Value	Countries of origin (percent by value in parentheses)
	Pounds		
Phytol	12	3,026	Switzerland (100)
Pilocarpine hydrochloride	70	1,870	Switzerland (86); France (14)
Piperazine hydrate	220	1,734	Switzerland (100)
Potassium metabisulfite	76,458	8,525	United Kingdom (53); France (34); Italy (11); Belgium
Potassium oxalate	11,020	1,784	Belgium (100)
Potassium persulfate	13,240	1,471	Netherlands (100)
Potassium sulfocyanide	16,386	6,708	United Kingdom (100)
Progesterone crystals	....	6,105	Hungary (100)
Protein derived from mare serum	164	8,928	Argentina (54); Brazil (46)
Ratin	4,008	2,489	Denmark (65); United Kingdom (35)
Reducine	....	2,338	United Kingdom (72); Irish Free State (28)
Sandofix K	5,071	2,188	Switzerland (100)
Sandoptal Puriss	44	1,428	Switzerland (100)
Sodium cacodylate	719	2,083	France (100)
Stabilizer A. P.	6,834	1,387	Switzerland (100)
Sufix	5,117	1,371	Netherlands (100)
Sulfichton	13,669	4,374	U. S. S. R. (100)
Testosterone propionate	....	60,295	Switzerland (96); Sweden (3); Belgium (1)
Thallium sulfate	1,000	4,573	Germany (100)
Thiourea	21,756	8,800	United Kingdom (100)
Yohimbine hydrochloride	136	3,149	Switzerland (94); France (6)

U. S. Imports of Certain Industrial Chemicals During June, 1941

Commodity	Quantity in Pounds	Value in Dollars
Derivatives		
Hydroxalkylamines	364	1,521
Dihydric alcohols	1,750	643
Vinyl acetate	79,393	9,527
Vinyl acetate resins, n. s. p. f.	84,100	23,625
Acids and anhydrides		
Acetic over 65%	349,220	16,412
Arsenious	2,975,079	79,387
Sulfuric	640,303	3,792
Tartaric	2,205	1,350
Hydrochloric	400	17
Lactic over 55%	100	70
Acids, anhydrides,		
Ammonium	110	1,088
Chloride (muriate)	134,662	4,513
Carbonates	8,460	783
Ammonium thiocyanate (Sulfocyanate)	22,697	4,449
Barium		
Hydroxide	89,885	1,365
Cellulose except acetates		
Other forms	1,500	779
Camphor		
Natural, refined	28,800	19,076
Glycerin		
Crude	622,827	49,626
Magnesium		
Carbonate, prec.	204,600	10,978
Oxide	112	46
Salts, etc. n. s. p. f.	1,610	333
Potassium		
Carbonate	1,896	307
Chlorate	73,339	21,152
Perchlorate	6,614	1,360
Cream of tartar	4,740	1,522
Argols, tartar, etc. Under 90%	2,546,018	510,719
Permanganate	1,520	604
Other, n. s. p. f.	2,000	502
Sodium		
Sulfate		
Crude (ton)	6,025	79,863
Anhydrous (ton)	1	27
Cyanide	4,354,900	167,950
Silicate	2,590	54
Silicofluoride	33,289	3,019
Radium salts (milligrams)	1,100	27,500
Calcium		
Chloride	14,000	795
Tartrate	921,818	210,895
Uranium oxide; salts	507	918
Strontium	1,022,824	7,185
Acetone, ethyl methyl keytone; acetone oil	11	35
Acetylene black	371,513	39,293
Blackings, powders	......	12,618
Casein stock	2,662	1,618
Chalk, prec.	273,616	3,138
Decolorizing carbons	124,680	1,154
Flavoring materials		
Non-alcoholic	615	657
20 to 50% alcohol	64	73
Formaldehyde	24,696	2,544
Hexamethylenetetramine	2,665	521
Manganese compounds		
Other, n. s. p. f.	28,600	1,949
Zinc		
Sulfide	259	263
Synthetic gums; resins, n. s. p. f.		
Made from vinyl acetate	200	183
Elements, compounds, salts, n. s. p. f.		
Non-alcoholic	......	3,896

New Trade Marks of the Month

CLINTON
390,235

KRYSTYL-KLEER
390,247

PUTTITAPE
390,340

MONTANIN
417,096

Corvet
421,910

SAIL INTO LIFE
421,911

SYRETTE
422,107

DENTHOL
426,880

ROACH FLAKES
429,508

MAGLITE
432,142

SUN FLOSS
433,490

SUPER FLOSS
433,572

TRAFFIC TOP
433,700

ADDS-TRACTION
434,099

TOCOPHEREX
434,579

DS DEATH SPRAY INSECT SPRAY
437,351

REDUSKID Liquid Wax
439,858

Ana-Serol
440,693

Dermo-Serol
440,698

Recto-Serol
440,700

POSAMAX
440,878

BONA-KLEEN
441,564

BIG DIME
442,103

OCTO-SOLVE
442,252

ALUTROPIN
442,409

IGLOO
442,785

SCHEIN
442,918

SULDETOX
443,052

SULDERM
443,053

SUL-GIENE
443,056

Spotticator
443,205

Fog-Mastur
443,512

RIPE-ON
443,581

PENTERGENT
443,666

GLOBEX A PEERLESS PRODUCT
443,730

BORER-SOL
443,749

CALSUL
443,750

C C F O O
444,255

PRESERVOL
444,310

GONADOPHYSIN
444,314

MILKWISE
444,322

METACYL
444,442

SYNTHA-BETA
444,515

SOPET
444,539

LAKCEL
444,562

CLINITEST
444,567

Trade Mark Descriptions

390,235. (Not subject to opposition) Clinton Company, Clinton, Iowa, June 12, '40; for soy bean products, on soy bean oil since Apr. 27, '36, on soy bean oil meal, since Dec. 23, '35, on dessert powders, since June, '35.

390,247. (Not subject to opposition) Harry J. Paul (J. C. Paul & Co.) Chicago, Ill.; May 31, '41 for bactericide; since Oct. 25, '34.

390,340. (Not subject to opposition) National Greenhouse Mfg. Co., Pana, Ill.; Aug. 3, '40; for gum sealing composition on a deformable lead strip used in glazing operations; since June 28, '40.

417,096. Montanin Company, Inc.; N. Y., N. Y.; Mar. 15, '39; for antiseptics, fungicides, and disinfectants; since Jan. 4, '30.

421,910. Stewart & Ross Corp.; L. I. City, N. Y.; July 24, '39; for vitamin capsules; since June 15, '39.

421,911. Stewart & Ross Corp.; L. I. City, N. Y.; July 24, '39; for vitamin capsules; since June 15, '39.

422,107. E. R. Squibb & Sons, N. Y., N. Y.; July 29. '39; for medicinal preparations; since July 14, '39.

426,880. Denthol Company, San Francisco, Calif.; Dec. 26, '39; for antiseptic mouth wash; since July 7, '38.

429,508. Agricultural Laboratories, Inc.; Columbus, O.; Mar. 15, '40; for insecticides, particularly roach bait; since Nov. 16, '39.

432,142. Marine Chemicals Co., Ltd., San Francisco, Calif.; (name changed to Marine Magnesium Products Corp.) May 20, '40; for light magnesium oxide; since Nov. 4, '39.

433,490. Johns-Manville Corp., N. Y., N. Y.; June 28, '40; for amorphous silica in powdered form; since Apr. 22, '40

433,572. Johns-Manville Corp., N. Y., N. Y.; July 1, '40; for amorphous silica in powdered form; since Jan. 4, '40.

433,700. The Celotex Corp., Chicago, Ill.; July 5, '40; for adhesive compounds, base; since Feb. 14, '38.

434,099. Adds-Traction, Inc., Hammond, Ind.; July 18, '40; for specially prepared liquid for application to rubber articles and particularly to pneumatic tire casings for increasing purchase or traction; since Feb. 16, '40.

434,579. E. R. Squibb & Sons, N. Y., N. Y.; Aug. 1, '40; for medical preparation; since July 24, '40.

437,351. J. G. Pizzitola (Beaumont Chemical Co.), Houston, Tex.; Oct. 28, '40; for insecticide; since Nov. 12, '30.

439,858. The Davies-Young Soap Co., Dayton, O.; Jan. 22, '41; for prepared liquid wax; since Jan. 17, '41.

440,693. Merz & Co. Chemical Works, Inc., East Orange, N. J.; Feb. 15, '41; for topical anesthetic; since Nov. 10, '36.

440,698. Merz & Co. Chemical Works, Inc., East Orange, N. J.; Feb. 15, '41; for skin preparation; since Dec. 28, '34.

440,700. Merz & Co. Chemical Works, Inc., East Orange, N. J.; Feb. 15, '41; for medication; since Mar. 17, '30.

440,878. Daniel G. Posades, Buenos Aires, Argentina, Feb. 21, '41; for casein; since June 27, '40.

441,564. Bona-Kleen Company, Los Angeles, Calif.; Mar. 15, '41; for cleaner and preservative for white side-wall tires; since Apr. 30, '40.

442,103. Bray Chemical Co., Chicago, Ill.; May 31, '41; for lye; since Feb. 17, '41.

442,252. Brulin & Company, Inc., Indianapolis, Ind.; Apr. 4, '41; for cleaning compound; since July 1, '39.

442,409. Campbell Products, Inc., N. Y., N. Y.; Apr. 9, '41; for medicinal; since Mar. 11, '41.

442,785. General Printing Ink Corp., N. Y., N. Y.; Apr. 21, '41; for adhesives; since Dec. 5, '39.

442,918. Abraham L. Schein, N. Y., N. Y.; Apr. 24, '41; for pharmaceutical preparations; since May, '22.

443,052. Ridgefield Chemical Company, Inc., N. Y., N. Y.; Apr. 28, '41; for preparation for the control of fermentation; since 1924.

443,053. Ridgefield Chemical Company, Inc., N. Y., N. Y.; Apr. 28, '41; for medical preparation; since 1924.

443,056. Ridgefield Chemical Co., Inc., N. Y., N. Y.; Apr. 28, '41; for preparation for use as a mouth wash; since 1924.

443,205. The Pennsylvania Salt Mfg. Co., Philadelphia, Pa.; May 2, '41; for cleaning fluid for fabrics; since Sept. 8, '36.

443,512. Marion F. Murray (Murray Chemical Mfg. Co.) Dallas, Tex.; May 12, '41; for chemically treated cloths to be wiped over glass and other surfaces to prevent fogging due to condensation of moisture thereon; since Apr. 18, '41.

443,581. Silmo Chemical Corp., Vineland, N. J., May 14, '41; for insecticide; since Apr. 1, '41.

443,666. National Oil Products Co., Harrison, N. J.; May 17, '41; for detergent preparation; since Jan., '41.

443,730. The Peerless Carbon Blac Co., Pittsburgh, Pa., May 20, '41; for carbon black; since May 5. '41.

443,749. Destruxol Corp., Ltd., Pasadena, Calif.; for chemical solution for combatting tree borer and the like

443,750. Destruxol Corp., Ltd., Pasadena, Calif.; May 21, '41; for lime and sulfur oil spray; since June 14, '31.

444,255. Co-Operative Feed Dealers, Inc., Binghamton, N. Y.; June 6, '41; for wheat germ oils; since Feb. 11, '41.

444,310. The Ruberoid Co., Boundbrook, N. J., and N. Y.; June 7, '41; for creosote oil for preserving lumber; since Mar. 6, '34.

444,314. G. D. Searle & Co., Chicago, Ill.; June 7, '41; for anterior pituitary gonadtropic hormone; since Feb. 28, '41.

444,322. Nathan Blank, Brooklyn, N. Y.; June 9, '41; for leather and shoe polishes and detergents; since May 1, '40.

444,442. E. I. du Pont de Nemours & Co., Wilmington, Del.; June 12, '41; for dyes and dyestuffs; since May 6, '41.

444,515. William R. Warner & Co., Inc., N. Y., N. Y.; June 13, '41; for synthetic vitamin preparation; since June 3, '41.

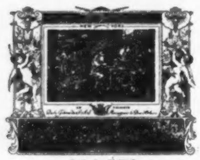
444,539. Monsanto Chemical Co., St. Louis, Mo.; June 14. '41; for chemical products; since Mar. 7, '40.

444,562. Battle Creek Dietetic Supply Co., Battle Creek, Mich.; June 16. '41; for cellulose products; since May 15, '41.

444,567. Effervescent Products, Inc., Elk-

† Trademarks reproduced and described include those appearing in the *Official Gazette* of the *U. S. Patent Office*, Sept. 2 to Sept. 30, 1941.

New Trade Marks of the Month



444,570

Flea Insurance Kit
444,609

Zelamol
444,615

Zellamine
444,616

Peresin
444,739

CAL-ZINC
444,839

Baiz.
444,843

Wyandotte Better Blend Soda
444,909

SALURMED
444,958

DEMIRUB
444,971

EDISON
444,990

ADDRISE
445,023

POWERIN
445,103

VICAPSYN
445,189

DUOSOL
445,191

ALEXYL
445,324

"LURIN"
445,326

Powderene
445,348

QUIKRETE
445,368

MERSOLITE
445,375

TWECOTAN
445,399

AIRLION
445,401

BADGER GAS
445,421

EXPANSET
445,462

SULFONACREME
445,471

MYSTITE
445,478

ROCCAL
445,483

PLURAXIN
445,513

CYSTOPAQUE
445,522

TRAPADIN
445,524

PRESTO
445,529

NIFON
445,533

HEXANATE
445,599

445,634

ETERNALURE
445,635

TIMOLAX
445,707

GRAINO
445,712

Calrite
445,785

TETRATHIONE
445,828

VASODRINE
445,858

VITAMIST
445,918

NY-LITE
445,922

HONEYTRAIL
445,946

WHITE STAR
445,969

NATURSOWN
446,032

RENESITE
446,035

SPAN
446,036

JAYGOL
446,082

X-SAL
446,286

hart, Ind.; June 16, '41; for preparation for use as an indicator; since Jan. 27, '41.

444,570. Givaudan-Delawanna, Inc., N. Y., N. Y.; June 16, '41; for organic odoriferous and flavor-imparting chemicals; since June 28, '40.

444,609. Polk Miller Products Corp., Richmond, Va.; June 17, '41; for flea powder, and pine oil disinfectant; since May 13, '41.

444,615. Takamine Laboratory, Inc., Clifton, N. J.; June 17, '41; for healing ointment; since June 5, '41.

444,616. Takamine Laboratories, Inc., Clifton, N. J.; June 17, '41; for healing ointment; since June 5, '41.

444,739. Perkins Glue Company, Lansdale, Pa.; June 21, '41; for liquid urea-formaldehyde resin; since June 4, '41.

444,839. The Sherwin-Williams Co., Cleveland, O.; June 25, '41; for insecticides and fungicides; since Apr. 29, '41.

444,843. Whitson Products Co., Inc., N. Y., N. Y.; June 25, '41; for ice cream improver made with dextrose and vegetable gum; since May 19, '41.

444,909. Michigan Alkali Co., Wyandotte, Mich.; June 27, '41; for bicarbonate of soda; since June, '41.

444,958. Charles Reinsch (Cerex Products) N. Y., N. Y.; June 28, '41; for pharmaceutical preparation; since Apr. 24, '41.

444,971. David Lilienblum, N. Y., N. Y.; June 30, '41; for dandruff removing preparation; since June 28, '41.

444,990. Thomas A. Edison, Inc., West Orange, N. J.; July 1, '41; for gases; since Dec. 16, '38.

445,023. Adolphe Lambert Theodore Troquet (A. Troquet & Co.) Utica, N. Y.; July 2, '41; for composition for treating hat sweat bands to preserve the hair; since Feb. 12, '41.

445,103. Powerin Corp., Buffalo, N. Y.; July 5, '41; for fuel additive; since May 26, '41.

445,189. Abbott Laboratories, N. Chicago, Ill.; July 9, '41; for compound of synthetic water soluble vitamins; since June 20, '41.

445,191. American Colloid Corp., N. Y., N. Y.; July 9, '41; for emulsifying and degreasing solvents; since July 1, '37.

445,324. Alex C. Fergusson Co., Philadelphia, Pa.; July 14, '41; for disinfectants; since Mar. 25, '40.

445,326. Harry M. Margulies, Chicago, Ill.; July 14, '41; for pharmaceutical antacid preparation; since Sept., '40.

445,348. Von Schrader Mfg. Co., Racine, Wis.; July 14, '41; for dry cleaning powder for rugs; since May 15, '41.

445,368. Southern States Portland Cement Co., Rockmart, Ga.; July 15, '41; for high early strength cement; since May 19, '41.

445,375. F. W. Berk & Co., Inc., N. Y., N. Y.; July 16, '41; for phenyl mercury salts of organic acids, imides, etc.; since June 11,

445,399. Taylor, White Extracting Co., Camden, N. J.; July 16, '41; for tanning extracts; since Oct. 24, '34.

445,401. Turco Products, Inc., Los Angeles, Calif.; July 16, '41; for industrial metal cleaning compounds; since June 15, '37.

445,421. George H. Helmer (Badger Gas Products) Platteville, Wis.; July 17, '41; for liquefied petroleum gas; since Jan. 10, '39.

445,462. Expanset Corp., Pawtucket, R. I.; July 18, '41; for hydraulic cement; since Nov. 30, '40.

445,471. The Reserve Research Co., Cleveland, O.; July 18, '41; for medicinal preparation; since Dec. 9, '40.

445,478. Shulton, Inc., N. Y., N. Y.; and Hoboken, N. J.; July 18, '41; for cosmetic containers.

445,483. Alba Pharmaceutical Co., Inc., N. Y., N. Y.; July 19, '41; for antiseptic and disinfectant preparation; since Apr. 1, '41.

445,513. Winthrop Chemical Co., Inc., N. Y., N. Y.; July 18, '41; for multiple vitamin preparation; since June 30, '41.

445,522. Grubb Laboratory, Inc., Seymour, Ind.; July 21, '41; for medical preparation; since July 7, '41.

445,524. International Vitamin Corp., New York, N. Y.; July 21, '41; for vitamin preparations; since July 11, '41.

445,529. Presto Color Co., Ducahy, Wis.; July 21, '41; for coloring material for leather; since July 20, '17.

445,533. Seal-Ins Laboratories, Inc., Los Angeles, Calif.; July 21, '41; for medicinal compound; since July 12, '41.

445,599. Abbott Laboratories, N. Chicago, Ill.; July 24, '41; for vasodilator; since July 14, '41.

445,634. National Lead Company, N. Y., N. Y.; for zinc and alloys; since May '41.

445,635. Onxy Oil & Chemical Co., Jersey City, N. J.; July 25, '41; for textile finishing compounds; since Apr. 1, '41.

445,707. Thos. J. Iles, N. Y., N. Y.; July 26, '41; for laxative; since July 24, '41.

445,712. W. L. Benson, Bridgeton, Ind.; July 29, '41; for synthetic hormone compound; since July 1, '40.

445,785. American Dietaids Co., Inc.; Yonkers, N. Y.; July 31, '41; for vitamin preparation; since June 30, '41.

445,828. G. D. Searle & Co., Chicago, Ill.; July 31, '41; for sodium tetrathionate preparation for intravenous use; since Dec. 8, '38.

445,858. Premo Pharmaceutical Laboratories, Inc., N. Y., N. Y.; Aug. 1, '41; for circulatory stimulant; since Sept., '38.

445,918. Burgess Seed & Plant Co., Inc., (V. & M. Products Co.) Galesburg, Mich.; Aug. 4, '41; for plant growth stimulant; since June 1, '41.

445,922. Drug Leaders, Inc., (Ny-Lite Company), San Francisco, Calif.; Aug. 4, '41; for chemical composition; since Mar. 3, '41.

445,946. Johnson Ant Control, Oakland, Calif.; Aug. 4, '41; for pest control preparations; since Apr. 1, '41.

445,969. Van Camp Sea Food Company, Inc., (Van Camp Laboratories), Terminal Island, Calif.; Aug. 4, '41; for vitamin concentrate in capsule form; since Jan. 13, '41.

446,032. Southern Phosphate Corp., Baltimore, Md.; Aug. 6, '41; for phosphates; since July 26, '41.

446,035. Atlas Powder Company, Wilmington, Del.; Aug. 7, '41; for emulsifiers; since July 14, '41.

446,036. Atlas Powder Co., Wilmington, Del.; Aug. 7, '41; for emulsifiers; since June 25, '41.

446,082. Jaygol Products Corp., N. Y., N. Y.; Aug. 8, '41; for insecticides; since July 11, '41.

446,286. Herman C. Cassini (X-Sal Drug Company), Orange, N. J.; Aug. 15, '41; for saline preparation; since Sept. 27, '37.

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A Complete Check—List of Products, Chemicals, Process Industries

Additional Patents from the volumes (Vol. 529, Nos. 1, 2, 3, 4 and Vol. 530, No. 1) digested last month are given in the first four groups, namely: Petroleum; Resins, Plastics; Rubber; and Textiles.

Petroleum

Distillation process. No. 2,254,182. Wheaton W. Kraft to The Lummus Co.

Process Obtaining Valuable Diesel Fuels from paraffin containing tar from solid carbonaceous material. No. 2,254,322. Friedrich Schick to Deutsche Erdol-Aktiengesellschaft.

Lubricant comprising mineral lubricating oil, a phosphorized fatty oil and a stable highly halogenated aliphatic hydrocarbon having a boiling point not substantially below 180°C. No. 2,254,337. William A. Whittier to The Pure Oil Co.

Selective Extraction of hydrocarbon oils. No. 2,254,364. Peter J. Gaylor to Standard Oil Development Co.

Process which comprises adding to peroxide-containing alkyl ether a small amount of a petroleum oil fraction boiling between about kerosene and about light lubricating boiling ranges and distilling the same. No. 2,254,404. Wolfgang C. Winning to Standard Oil Development Co.

Composition of Matter comprising a waxy lubricating oil and a small amount, not greater than 2%, of a pour point depressing polyester formed from a polyhydroxy aliphatic alcohol with a long hydrocarbon chain and a polycarboxylic aromatic acid. No. 2,254,433. Eugene Lieber to Standard Oil Development Co.

Method of initiating production or increasing the output of a well which comprises introducing into the well mono-chloracetic acid together with magnesium and phosphorus pentachloride. No. 2,254,-443. Gustaf E. Ostrom to Babel E. Richart and Jack C. Renfro.

Lubricating Oil containing a small amount of a diaryl ethylenediamine compounds of a halogenated carboxylic acid having at least six carbon atoms. No. 2,254,490. John M. Musselman to The Standard Oil Co. (Corp. of Ohio).

In **Polymerization of Olefins** in the presence of sulfuric acid at polymerizing temperature above atmospheric whereby there is formed a polymer liquid boiled to vaporize lighter components thereof, the method which comprises supplying the heat for said boiling by direct introduction of steam to said liquid to prevent decomposition of the esters and then treating the liquid with additional steam in the presence of alkali to hydrolyze and separate said esters. No. 2,254,522. Clarence G. Gerhold to Universal Oil Prods. Co.

Hydrocarbon Oil. Conversion process. No. 2,254,551. Kenneth Swartwood to Universal Oil Prods. Co.

Catalytic Treatment of Hydrocarbons. No. 2,254,453; 2,254,555. Charles L. Thomas to Universal Oil Products Co.

Freeing Paraffin Wax from accompanying hydrocarbon oils which comprises: bringing said wax to a liquid condition; introducing a high velocity stream of said liquid wax into a flowing stream of an oil solvent consisting at least in part of acetone; retarding the velocity of said mixed flowing stream in a collected body of said mixture and setting precipitated wax from solvent in said body, and expelling the remainder of said solvent downwardly from the wax collected in said body by said settlement and filtration. No. 2,254,-597. Henry G. Berger and Gerald M. Fisher and Frederick C. Ruff to Socony-Vacuum Oil Co.

Saturated Carbonylic Compounds. Process for production. No. 2,254,-615. Sumner H. McAllister and William A. Bailey, Jr. to Shell Development Co.

Regenerating Spent Catalysts, comprises the steps of treating catalyst comprising aluminum halide and an adsorptive alumina with a base of sufficient strength to selectively convert the aluminum halide into a soluble alluminate, washing the carrier to remove excess base, drying the washed carrier material, and recombining the recovered carrier with a fresh portion of aluminum halide. No. 2,254,618. Frank M. McMillan and George S. Parsons to Shell Development Co.

Sulfur Carrier for Lubricants comprising a sulfurized unsaturated aliphatic alcohol having at least 8 carbon atoms. No. 2,254,756. Ernest Segessemann to National Oil Products Co.

Resins, Plastics

Synthetic Resin comprising the reaction product of a polyhydric alcohol, the adduct of maleic anhydride with an isoprene and derived from light oil obtained in the manufacture of combustible gas and in which fraction isoprene is the predominant diolefine constituent, and at least one of a group consisting of drying oil and drying oil acid. No. 2,251,297. Frank J. Soday to The United Gas Improvement Co.

Synthetic Resin comprising the reaction product of a polyhydric alcohol, the adduct maleic anhydride with a piperylene fraction containing up to approximately 90% piperylene and derived from light oil obtained in the manufacture of combustible gas and in which fraction piperylene is the predominant diolefine constituent and at least one of a group consisting of drying oil and drying oil acid. No. 2,251,298. Frank J. Soday to The United Gas Improvement Co.

Coloring Polymers. Method coloring normally crystalline vinylidene chloride polymers which comprises providing a supercooled form of such polymer and bringing same into contact with a coloring agent dispersed in a volatile organic liquid which wets the surface of the polymer. No. 2,251,486. Alden W. Hanson to The Dow Chemical Co.

Synthetic Linear Polyamide Filament. Method for increasing coefficient of friction thereof. No. 2,251,508. Frederick K. Watson to E. I. du Pont de Nemours & Co.

Polymers. Process of making same from cyclic amide which contains more than 6 annular atoms consisting of carbon atoms and of amido nitrogen atoms forming part of an amide grouping which is an integral part of the annular structure. No. 2,251,519. Robert M. Joyce and David M. Ritter to E. I. du Pont de Nemours & Co.

Resinous Reaction Product and process therefor. No. 2,251,806. John B. Rust and Irving Pockel to Ellis-Foster Co.

Polymeric Material. Nos. 2,252,554 and 2,252,555. Wallace H. Carothers to E. I. du Pont de Nemours & Co.

Polymeric Material. No. 2,252,557. Edward P. Czerwin to E. I. du Pont de Nemours & Co.

Resinous Composition comprising a polyvinyl halide plasticized with an ester of a phenyl alkyl alcohol and an aliphatic dibasic acid of the class $C_nH_{2n-2}O_4$, where -n- is at least 6. No. 2,253,137. John J. Russell to General Electric Co.

Plastic Product. Composition of matter comprising a polymerizate of styrene and in aryloxy-alkyl ester of an unsaturated acid. No. 2,253,886. Edgar C. Britton, Gerald H. Coleman and John W. Zemba to The Dow Chemical Co.

Rubber

Softening Crude Rubber, comprises heating rubber at 170°F. with small proportion of thianthrene. No. 2,251,394. Warren F. Busse and Edward N. Cunningham to The B. F. Goodrich Co.

Rubber-sulfur Composition for use in producing vulcanized rubber articles. No. 2,252,318. James H. Gravell, E. H. Rishel to American Chemical Paint Co.

Chlorinated Rubber and a method for its production. No. 2,252,728. John M. Peterson to Hercules Powder Co.

Latex having incorporated therein as preservative at least 0.07% ammonia, the amount being only a fraction of that required to preserve the latex by ammonia alone and a water soluble penta chlor phenate in an amount sufficient to provide an effectively preserved latex. No. 2,254,267. Thomas S. Carswell to Monsanto Chemical Corp.

Textiles

Textile Printing method comprises printing one or more colors with a hydrophobe lacquer printing paste, and thereafter printing one or more colors with an aqueous printing paste. No. 2,251,914. Norman S. Cassel to Interchemical Corp.

Artificial Thread, method of making same from synthetic polymer filament. No. 2,251,962. Alexis Sommaripa to E. I. du Pont de Nemours & Co., Inc.

Hairy Yarn, process of producing same from cellulose acetate filaments by subjecting to abrasion to rupture filaments at intervals, twisting the yarn and applying a non-lubricating tacky fluid capable of imparting a coefficient of friction of at least 0.4. No. 2,252,038. Frank R. Scull to Celanese Corporation of America.

Rendering Textiles Water Repellent by heating with compound of high molecular weight containing a hydrocarbon group of at least 8 carbon atoms and a group having an oxygen atom joined to two adjacent linked carbon atoms, at a temperature above about 100°C. until water-repellence occurs in said fibrous material. No. 2,252,-039. Erik Schirm to Heberlein Patent Corp.

Cellulosic Textile treatment to selectively dissolve and remove therefrom the lesser celluloses, sugars, glucosides and other impurities without dissolving the alpha cellulose content thereof. No. 2,252,-732. Eric W. Ridgway and William A. Bodenschatz to Ridbo Laboratories, Inc.

Yarn Conditioning process and the product thereof. No. 2,253,081. James G. McNally and Joseph B. Dickey to Eastman Kodak Co.

Reducing Shrinkage of wool by treating with an alpha-halogenated ether wherein the organic radicals have each not more than six carbon atoms, said ether being employed as such. No. 2,253,102. Joseph F. Walker to E. I. du Pont de Nemours & Co.

Synthetic Linear Polymer Yarns. Method of sizing. No. 2,253,146. Edgar W. Spanagel to E. I. du Pont de Nemours & Co.

Coloration of Textile Materials having a basis of organic esters of cellulose. No. 2,253,641. Robert W. Moncrieff and Albert W. M. Cooke to Celanese Corp. of America.

Crease-Resistance of Textiles. Process for increasing said property. No. 2,254,001. Rollin F. Conaway to E. I. du Pont de Nemours & Company.

Substantially Inelastic Composite Yarn comprising longitudinally contiguous lengths of elastic strand and of highly twisted and sized textile thread, productive of a creped thread on desizing thereby to impart limited elasticity to said yarn. No. 2,254,712. Thomas L. Shepherd to The Clark Thread Co.

Production of Artificial Staple Fibers resembling wool, which comprises spinning viscose in a precipitating bath containing more than 70 per cent of an alcohol of comparatively low boiling point and subsequently decomposing the freshly coagulated xanthate threads by subjecting said threads to the action of a medium having a temperature of from about 90 to about 150°C. No. 2,254,777. Paul Esselmann Kreis Bitterfeld and Fritz Davidshofer to Walther H. Duisberg.

Production of Composite Yarn comprises doubling together by means of a doubling twist, a voluminous yarn and a basic yarn and applying an adhesive size removable by scouring to at least one of the component yarns prior to the doubling operation so that after the doubling operation the component yarns are stuck together. No. 2,254,881. Angus S. Bell to Celanese Corp. of America.

Cellulose

Cellulosic article. Composition of matter comprising 5 parts of cellulose acetate and a volatile solvent, 1½ to 2 parts of triacetine, and 1½ to 2 parts of tributyl phosphate. No. 2,255,828. Antonie Sonneveld to Transtone Corp.

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Cementing regenerated cellulose to rubber which comprises first impregnating a regenerated cellulose with a cation-active alkylpyridinium compound and subsequently applying a rubber thereto. No. 2,255,834. Joseph I. Taylor and Karl T. Schaefer to North American Rayon Corp.

Method of rapidly seasoning sheets containing cellulose acetate which includes the steps of bathing in slightly diluted methanol and subsequently drying said sheets. No. 2,256,387. Edward S. Farrow and Stewart J. Carroll to Eastman Kodak Co.

Preparing an oxidized cellulose in which alcohol groups of the cellulose are oxidized to carboxyl groups by treating the cellulose with at least approximately 4 parts of a mixture essentially consisting of liquid NO_2 and 5-15% of nitric acid. No. 2,256,391. Gordon D. Niatt to Eastman Kodak Co.

Ceramics, Refractories

Refractory Bodies of Tin Oxide. Method of making. No. 2,256,033. Dan McLachlan, Jr. to Corning Glass Works.

Foundry Binder consisting of boric anhydride and a preponderance of clay. No. 2,256,046. Harry W. Dietert to Peerpatco, Inc.

Mold composition consisting of a preponderance of sand, a clay of which montmorillonite is a large constituent and an added amount of iron oxide. No. 2,256,047. Harry W. Dietert to Peerpotco, Inc.

Foundry composition comprising in combination said, a montmorillonite clay and a substantial amount of silica flour. No. 2,256,456. Harry W. Dietert to Peerpatco, Inc.

Low-melting Lead Glaze maturing below 1200°F. and containing at least 25% by weight of lead oxide, said glaze composition comprising from 0.25 to 3% by weight of a halogen selected from the group which consists of chlorine, bromine, and iodine. No. 2,255,-044. Alden J. Deyrup to E. I. du Pont de Nemours & Co.

Luminescent glass of the uranium-lead type carrying a luminescence-affording content of a compound of a metal of the group that consists of uranium and lead, such glass being of intensified luminescence by virtue of an alkali content in which potassium oxide is preponderant over sodium oxide by at least a 2:1 ration and a zinc oxide content of substantially 3.5-710%. No. 2,255,109. Hellmuth Fischer.

Glass consisting of silica, boric oxide, and alumina, the silica being from 91% to 95% and the alumina being from 4% to 8%. No. 2,255,558. Robert H. Dalton to Corning Glass Works.

Magnesia-lime-silica refractory. No. 2,256,795. Gilbert E. Seil to E. J. Lavino & Co.

Sand Core comprising particles of sand bound into an integrated body by fused gilsonite. No. 2,256,832. Oscar H. King to Pacific States Cast Iron Pipe Co.

Foundry composition comprising in combination, sand, kaolinite and a clay of which montmorillonite is a large constituent. No. 2,256,943. Norman J. Dunbeck to Peerpatco, Inc.

Chemical Specialty

Antiseptic and detergent solution comprising a mono-amyl ether of glycerine and water, the monoamyl ether of glycerine being over 5% by volume of the solution. No. 2,255,916. George L. Doelling.

Incorporating wax in a gelatin photographic emulsion comprises adding an alkali metal salt of hexametaphosphoric acid to the gelatin emulsion and mixing the wax emulsion with the gelatin emulsion. No. 2,256,390. Edward Hewitson to Eastman Kodak Co.

Hydraulic Brake Fluid comprising by volume about 6 parts of a homogeneous mixture of polypropylene glycol with the polypropylene glycol mono-esters of the fatty acids derived from castor oil, about 3 parts of monopropylene glycol, and about 11 parts of butanol. No. 2,255,208. Harvey R. Fife to Carbide & Carbon Chemicals Corp.

Composition of Citrus Fruit constituents and boric acid and method for making same. No. 2,255,341. Clarence W. Wilson to California Fruit Growers Exchange.

Edible Container for ice cream or the like. No. 2,255,506. Nello Frediani.

Disinfectant Composition adapted for disinfecting interior and porous surfaces of shoes made essentially of leather and the like. No. 2,255,694. Edward B. Beale.

Starch size and method of preparing same. No. 2,256,474. Stoney Drake.

Ointment-like deodorant and antiperspirant preparation, containing as the only ingredient of ointment-like consistency a base consisting of about 100 parts by weight of an odor-absorbent, astringent hydrogel of aluminum containing between 75 and 85% of colloidal bound water, which dries upon application to the skin without leaving a powdery residue said hydrogel being prepared by reacting an alkali with an acid aluminum salt in boiling aqueous solution at a pH value between 5.0 and 6.5, the salt and the water being in the proportion of about 1 pound of said salt to about 1 gallon of water, in admixture with about 25 and 60 parts by weight of a hygroscopic polyhydroxy alcohol. No. 2,256,505. Marvin R. Thompson to William R. Warner & Co., Inc.

Abrasive articles of resin bonded abrasive grains. No. 2,256,618 Samuel S. Kistler and Carl E. Barnes to Norton Co.

Molded composition friction or tractive surface body such as a brake lining or clutch facing, comprising fibres bonded with an organic bond and containing as a distinct component of the body mass widely separated discrete rubbery coarse particles dispersed through the body mass, said discrete rubbery particles being insoluble in said bond, visibly distinct therein and consisting of a reaction or polymerization product of an anacardic acid material. No. 2,256,646. Joseph N. Kuzmick and Albert Whitelaw to Rabestos-Manhattan, Inc.

Strip-sealing material for glazing windows comprising a relatively flat non-resilient deformable backing support, a coating of plastic adhesive on said support, said coating comprising relatively thick edgewise regions only. No. 2,256,864. William C. Ferguson.

Coal Tar Chemicals

Manufacture of 4, 6 dinitro-ortho-cresol comprises reacting at an elevated temperature sulfuric acid of at least 75% strength with ortho-cresol, treating the resultant material in dilute solution with at least two molecular equivalents of nitric acid while maintaining the reacting mixture at a temperature of at least 70° C. separating the product formed, and washing said product by agitation in a molten condition with hot water. No. 2,256,195. William F. Filbert to E. I. du Pont de Nemours & Co.

3, 6-diaminoacridine compounds. No. 2,256,403. James G. McNally and Joseph B. Dickey to Eastman Kodak Co.

Carboxylic Acids. Process for the removal of detrimental and difficultly removable oxidizable impurities from a crude isobutyric acid prepared by the oxidation of isobutyraldehyde. No. 2,255,421. Herbert P. A. Groll and Miroslav W. Tamele to Shell Development Co.

An ester of a,B -dichloropropionic acid and a polyhydroxy organic compound. No. 2,257,021. Maxwell A. Pollack to Pittsburgh Plate Glass Co.

Coatings

Protective Coating. Method increasing resistance to corrosion of a galvanized metallic sheet having a damaged area in the zinc coating thereof produced by fabrication operations performed on said sheet after galvanization thereof, comprising the spreading of a soft, creamy, putty-like amalgam of zinc and mercury containing from 80 to 90% mercury by weight over and adjacent the damaged area of said sheet. No. 2,255,780. Henry L. Kohler to Andrew A. Kramer.

Liquid coating composition comprising from 62 to 68% pitch, at least 3% α-naphthylamine, from 7.8 to 13% mica, from 13 to 20% leafing discoid filler and from 0 to 2.5% asbestos to make 100% and having sufficient thinner added thereto to bring the viscosity of the resultant mixture to within 22 to 38 seconds Gardner. No. 2,255,825. John R. Skeen to The United Gas Improvement Co.

Protective coating. Method repairing a rupture in the zinc coating of a galvanized metallic sheet. No. 2,255,978. Henry L. Kohler to Andrew A. Kramer.

Protective coating. Method of making a corrosion resisting coating having the appearance of a galvanizing coating on a galvanized metallic sheet. No. 2,255,979. Henry L. Kohler to Andrew A. Kramer.

Dyes, Stains

Vat Dyestuff Prints. Process for producing. No. 2,255,778. Eduard Kambli, Ernst Stoecklin and Richard Tobler to Society of Chemical Industry in Basle.

Polyazo compounds. Dark brown powder, soluble in water with red coloration, soluble in concentrated H_2SO_4 producing brown shades, and which compounds dye cellulosic fibers bright-orange shades. No. 2,256,096. Eugene A. Markush to Pharma Chemical Corp.

Azo compounds. Process for preparing. No. 2,256,261. Andre Girard to Les Laboratories Francais de Chimiotherapie.

Anthraquinone Compounds. No. 2,255,045. Joseph B. Dickey and John R. Byers, Jr., to Eastman Kodak Company.

Filter Dyes for color photography. No. 2,255,077. Edmund B. Middleton to du Pont Film Manufacturing Corp.

Pseudocyanine Dye. No. 2,255,128. Oskar Riester to General Aniline & Film Corp.

Pararosaniline Dyestuffs containing at least one amino group in which at least one hydrogen atom attached to an amino group is replaced by a gamma-oxobutyl radicle. No. 2,255,385. Heinrich Hopff and Adolf Diebold to General Aniline & Film Corp.

Quinrhodine Quarternary Salts and dyes therefrom. No. 2,255,407. Leslie G. S. Brooker to Eastman Kodak Co.

Vat dye compositions. Nos. 2,256,805 and 2,256,806. Jena G. Kern to National Aniline & Chem. Co. Inc.

Process of dyeing with vat dyes. Nos. 2,256,807 and 2,256,808. Jena G. Kern to National Aniline & Chem. Co., Inc.

Method dyeing polyvinyl halide-acetate copolymer containing material with dyestuffs which form reduced leuco compounds which comprises subjecting the material to the action of an aqueous bath containing the reduced dye, and a strong alkali metal free nitrogen base, followed by oxidation of the color on the material by chemical oxidation. No. 2,257,076. Frederick E. Petke and Arthur F. Klein to American Cyanamid Co.

Equipment and Apparatus

Heat Exchange. No. 2,255,058. Eugene J. Houdry to Houdry Process Corp.

Hydrocarbon Treatment. Apparatus adapted for use in separating entrained solids and vapors from a mixture thereof. No. 2,255,059. Eugene J. Houdry to Houdry Process Corp.

Separating and Concentrating Gases. Method and apparatus therefor. No. 2,255,069. Charles G. Maier to The United States of America.

Colloidal Mill. No. 2,255,105. Lewis M. Dixon to Columbia Ribbon & Carbon Mfg. Co, Inc.

Means for Distilling Turpentine Gum. No. 2,255,145. Lewis T. Baker.

Fluid Heat Exchange Apparatus. No. 2,255,233. Frederick S. Tollow to The Babcock & Wilcox Co.

Machine for Feeding Measured Quantities of a divided material like metallic dust. No. 2,255,325. Louis D. Mills to The Merill Co.

Horizontal Coking Retort Oven. No. 2,255,406. Joseph Becker to Koppers Co.

Battery of Horizontal Coking Chamber Ovens. No. 2,255,425. Heinrich Koppers to Koppers Co.

Apparatus for Blunging and Decolorizing Clay. No. 2,255,429. Sanford C. Lyons to Bird Machine Co.

In Apparatus for Absorbing Moisture from Gases Like Air, a plurality of rope-like elements each of said elements being formed of asbestos fiber carrying a moisture absorbing chemical having the property of deliquescence, a supporting wire engaging about each of said elements and a supporting frame for said elements to which the end of said wires are attached, said elements being disposed within the frame whereby passages are formed between the elements for flow of air. No. 2,255,523. Clyde L. Hunsicker.

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Device for Minutely Dispersing Gases in Liquids in which there are sources of gas and liquid media. No. 2,255,532. Werner Rank.
Acetylene Generator. No. 2,255,536. Elmer H. Smith to Smith Welding Equipment Corp.
Vaporizing Apparatus for hydrocarbon liquids. No. 2,255,747. Sam P. Jones.
Metallurgical Furnace. No. 2,255,844. Henri L. Getil to Societé d'Electrochimie, d'Electrometallurgie et des Acieries Electriques d'Ugine.
Apparatus for Preparing Bituminous Cement aggregate compositions. No. 2,256,281. Sam E. Finley.
Precision Apparatus for dividing flowing liquids into definite proportions. No. 2,256,362. Kenneth E. Stuart to Hooker Electrochemical Co.
Gas Analysis Apparatus. No. 2,256,395. Hans Laub to Charles Engelhard, Inc.
Vapor and Liquid Contact Apparatus. No. 2,256,438. James M. Larsen to Foster Wheeler Corp.
Apparatus for conditioning paper. No. 2,256,507. Charles G. Weber and Martin N. Geib to The Government of the United States.
Oil and gas separator. No. 2,256,524. James F. McKelvey to Vulcan Steel Tank Corp.
System for generating gas from liquefied gas, a tank, a perforated dome in the tank at the bottom thereof, pressure controlled heated fluid heating means in the dome in heat exchange relation therewith and a liquefied gas spewing tube rising from the dome and terminating near the top of the tank. No. 2,256,591. William H. Grindle.
Apparatus for recovering rock wool. No. 2,256,665. William E. Carson.
Separator for oil, gas and water mixtures. No. 2,256,695. Jay P. Walker to Guy O. Marchant and C. G. Wells.
Pasteurizing process and apparatus. No. 2,256,904. Edwin K. Kintner to Arco Welding & Machine Works, Inc.
Scraper for carbon black drum. No. 2,256,949. Charles E. McKinney to Continental Carbon Co.

Explosives

Potentially Detonating Explosive containing an alkali metal compound having an excess of combined oxygen, said explosive being sensitized with a relatively small percentage of a polyhalogen organic compound containing more than two halogen atoms. No. 2,255,653. John W. Dawson and William M. Dehn.

Fine Chemicals

Method Producing an Epi-cholesterol type of compound from a cholesteryl halide. No. 2,255,072. Russell E. Marker to Parke, Davis & Co.
A Steryl Magnesium Halide. No. 2,255,073. Russell E. Marker to Parke, Davis & Co.
Preparation of 3-Carboxy-Δ^5-Cholestene from a cholesteryl halide. No. 2,255,074. Russell E. Marker to Parke, Davis & Co.
In Extraction of Alkaloids from ergot step of treating ergot with an alkali metal alcoholate. No. 2,255,124. Marjorie B. Moore to Abbott Laboratories.
Urane Compounds and a method for preparing them. No. 2,255,264. Russell E. Market to Parke, Davis & Co.
Method for Production of Urane Derivatives oxygenated only at the number 3 and number 11 carbon atoms which comprises treating a non-phenolic ketonic carbinol fraction of pregnancy urine, from which trihydroxy steroids have been removed with a ketone reagent separating the reacted ketone fraction from the unreacted non-ketonic carbinol fraction and separately treating said fractions for isolation therefrom of purified individual ketonic and non-ketonic oxygenated urane compounds. No. 2,255,265. Russell E. Marker to Parke, Davis & Co.
Treatment Bath and process for the production of colored photographic pictures. No. 2,255,463. Bela Gaspar to Chromogen, Inc.
7-Dehydro-Steroids. Process comprising reacting a steroid characterized by having an esterified hydroxyl group in the 7-position and a double bond in the 5, 6-position of a cyclo-pentano-per-hydrophenanthrene nucleus with an additional non-acidic oxonium salt forming compound. No. 2,255,815. Hans R. Rosenberg and Theophilus Parsons, Jr. to E. I. du Pont de Nemours & Co.
Vitaminiferous Oils. In process of refining the step which comprises subjecting the oil to the action of activated carbon before the removal of all of the free fatty acids present therein. No. 2,255,-875. Loran O. Buxton and Eric J. Simons to National Oil Products Co.
5, 5-Disubstituted-2, 4-Thiazolidiones, and process of making them. No. 2,255,903. Horace A. Schonle and Wilbur J. Doran to Eli Lilly and Co.
Salicylic Acid sulphonyl sulphanilamides. No. 2,256,274. Friedrich Boedecker and Albrecht Heymons to J. D. Riedel-E. de Haen A. G.
Extracting an Oil from fish tissue by means of a solvent which has been freed of all volatile constituents by high vacuum distillation and which substantially contains only constituents having a lower vapor pressure than the vitamins contained in the fish tissue being extracted. No. 2,256,392. Kenneth C. D. Hickman to Distillation Products, Inc.
Antispasmodic Preparation comprising a saturated derivative of ethylamine. No. 2,256,434. Wilfred Klavehn and Anton Wolf to E. Bilhuber Corp.
Manufacture of pregnendiones of the general formula $C_{21}H_{32}O_2$, which comprises subjecting pregnenol-20-one-3 of the formula $C_{21}H_{32}O_2$ to the action of an oxidizing agent capable of converting a secondary alcohol group into a keto group. No. 2,256,500. Arthur Serini and Adolf Butenandt to Schering Corp.
Method of forming stable reaction product of alkali metal formaldehyde sulfoxylate and one of the group consisting of diamino diphenyl sulfone which comprises refluxing the alkali metal formaldehyde sulfoxylate and one of said diamino diphenyl sulfur compounds in an alcoholic reaction medium. No. 2,256,575. George W. Reiziss, LeRoy W. Clemence and Morris Freifelder to Abbott Laboratories.
Stable aqueous solution comprising a 9-polyhydroxyalkyl-isoalloxazine in a concentration of more than 0.013% and a water-soluble solubilizing agent selected from the group consisting of nicotinic acid amide and water-soluble salts of nicotinic acid. No. 2,256,604. Ernst Auhagen to Winthrop Chemical Co., Inc.
Photographic Emulsion and process of production. No. 2,256,720. Friedrich Lierg to Oskar Czeija.
Amidine Salts of aminobenzoic acids. No. 2,256,759. Garnet P. Ham to American Cyanamid Co.
Process treating animal glandular material which comprises admixing the glandular material in substantially its normal wet state with an inorganic sulfate chosen from the group consisting of ammonium sulfate, ammonium aluminum sulfate, aluminum potassium sulfate, aluminum sulfate and sodium hydrogen sulfate, allowing the mixture to stand to effect syneresis and pressing the mixture. No. 2,256,920. William D. Allers to Armour & Co.
In treatment of hormone material of the kind present in healthy urine and in the posterior lobe of the pituitary gland, and insoluble in concentrated ammonium sulfate solution, and containing a substance capable of lowering the blood pressure, the herein described step of heating such material in a solid state to a temperature between 100°C. and about 150°C. to destroy substances which are not stable at such temperatures. No. 2,256,933. Ernst Wollheim.

Industrial Chemicals

Capillary Active Compounds and process of preparing them. No. 2,255,082. Ludwig Orthner, Carl Platz, Hans Keller and Heinz Sonke to General Aniline & Film Corp.
Sodium Cyanide. Process of producing from ammoniacal aqueous solutions of sodium cyanide with a content of sodium cyanide of at least about 30% which consists in removing ammonia from the solution and avoiding a substantial evaporation of water while maintaining a temperature not exceeding about 40°C., a precipitation of solid sodium cyanide containing water of crystallization thus taking place, and then separating the precipitated sodium cyanide from the mother liquor. No. 2,255,107. Reinhold Fick & Karl Wintersberger to Walter H. Duisberg.
Recovery of Ammonia from spent cuprammonium silk precipitation liquors. No. 2,255,114. Alfred Haltmeier to Walther H. Duisberg.
Method of Preventing Overheating of a catalyst for exothermic reactions between gases which comprises initially passing the gases over the catalyst at a flow rate substantially below the desired full flow rate and subsequently increasing the rate of flow inversely as a function of temperature to the desired full rate. No. 2,255,-126. William W. Middleton to The M. W. Kellogg Co.
In Separation of Calcium Carbonate particles from a pulp containing such particles, the pulp having an alkalinity equivalent to a pH value of 6 to 9 process which comprises improving the cleanness of the concentrate by subjecting the pulp to froth flotation in presence of collecting agent capable of floating calcium carbonate and a resinate frothing agent, and prior to completion of flotation decreasing concentration of resinate dissolved in pulp by incorporating in pulp an inorganic compound capable of forming a resinate of low solubility selected from class consisting of mineral acids and alkaline earth metal salts which have a solubility in excess of that of the corresponding resinate salt. No. 2,255,139. Mikael Vogel-Jorgensen to Separation Process Co.
In Stabilization of High-Molecular Fatty Acids Animal and Vegetable Fats and Oils and Fish Oils subject to autoxidation with the formation of peroxides, the process which comprises adding to such a material, in a quantity sufficient to prevent oxidation thereof, at least one low molecular ester of gallic acid selected from a group consisting of the methyl, ethyl, propyl and butyl esters of gallic acid. No. 2,255,191. Theodore Sabalitschka and Erich Bohm to Heyden Chemical Corp.
Methylene Disulphide Polymer. Process comprising reacting an alkaline metallic disulphide with a reactive methylene body. No. 2,255,228. Joseph C. Patrick.
Solvent for Organic Film-Forming Materials comprising a polymerized mono vinyl compound dissolved in tetrahydrofurane. No. 2,255,-229. Walter Reppe, Otto Hecht and Fritz Oschatz to General Aniline & Film Corp.
Method Preparing Relatively Pure Stearic Acid and Monochlorinated palmitic Acid from a mixture containing stearic acid and palmitic acid which comprises treating such a mixture with a chlorinating agent in a quantity just sufficient to monochlorinate substantially all of the palmatic acid in the mixture, and then separating the monochloropalmatic acid from the stearic acid. No. 2,255,230. John Ross and Hans G. Kirschenbauer to Colgate-Palmolive-Peet Co.
Step in the Dehydration of Aqueous Acetic Acid which comprises subjecting the same to a counter-current of furfural, containing an added organic solvent other than furfural but having a boiling point in the rage of furfural and which will dissolve a negligible quantity of water and which is completely miscible with acetic acid and furfural in an extractor. No. 2,255,235. Theodore O. Wentworth.
Artificial Wax consisting essentially of a fat having a melting point higher than 20°C. and coumarone-indene resin having a melting point higher than 100°C. and completely soluble in mineral spirits at normal room temperature, the fat and the coumarone-indene resin being included within the approximate reciprocal ratio of 2:3 parts of one with 3:2 parts of the other. No. 2,255,242. Frank W. Corkery to Pennsylvania Industrial Chemical Corp.
Organic Nitrogenous Base Derivatives of ether derivatives and method of making same. No. 2,255,252. Benjamin R. Harris.
Lower Molecular Weight aliphatic sulphomonocarboxylic acid ester of an aliphatic polyhydroxy substance containing a higher molecular weight radical, said ester containing an aromatic carboxylic acid ester group. No. 2,255,285. Benjamin R. Harris.
Method of Polymerizing Mono-olefins which comprises subjecting a mono-olefin in gaseous state to contact with a catalyst comprising a bisulphate of an alkali metal in solid form, at a temperature between about 100°C. and the melting point of said bisulphate, and in the presence of water vapor in sufficiently small proportion to substantially avoid the presence of free water in liquid state at said temperature. No. 2,255,302. Henry J. Welge.
Derivative of an aliphatic polyhydroxy substance the hydrogen of at least one hydroxyl group of which is substituted by a sulphoaromatic carboxylic acid acyl radical, and the hydrogen of at least one hydroxyl group of the polyhydroxy substance is substituted by an aliphatic radical containing from 8 to 18 carbon atoms. No. 2,255,316. Benjamin R. Harris.

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Treatment of Clay. No. 2,255,371. Ira Williams and Nathan Millman to Sgoda Corp.

Process of Controlling or Retarding the Oxidation of Organic Substances which tend to deteriorate by absorption of oxygen from the air which comprises incorporating therein a composite product of thermal reaction with elimination of water of a N, N' diaryl-arylene-diamine and an aliphatic alcohol of the formula $R(OH)_n$ where R is an aliphatic hydrocarbon group; O is oxygen; H is hydrogen and n is a whole number not greater than 2. No. 2,255,386. Louis H. Howland to United States Rubber Co.

Method for Fractionating Linear Iso-olefin Polymer substance comprising dissolving the linear iso-olefin polymer in a hydrocarbon solvent, then adding to the solution a small amount of precipitant comprising an aliphatic combined-oxygen-containing liquid in an amount insufficient to precipitate the entire polymer and collecting the precipitated fractional portion of the polymer mixture. No. 2,255,388. John Kinc and Floyd L. Miller to Standard Oil Development Co.

Process of Producing High Molecular Weight Polymers comprising the steps of mixing isobutylene and phenyl acetylene, chilling the mixture to temperatures below —50°C. and polymerizing the mixture by the application thereto of a Friedel-Crafts type catalyst. No. 2,255,396. William J. Sparks and Clifford W. Muessig to Standard Oil Development Co.

Manufacture of Glycols. No. 2,255,411. Charles A. Cohen and Clayton M. Beamer to Standard Alcohol Co.

Magnesium Hydroxide. Production from brines containing dissolved magnesium salts, the steps which comprise treating calcium oxide with approximately 5 parts by weight of water having dissolved therein from about 0.15 to about 45.0 grams per liter of sodium sulphate to form a suspension of calcium hydroxide adding said suspension to the brine, the amount of calcium hydroxide being less than that required to react with all of the magnesium salts dissolved in the brine, to precipitate magnesium hydroxide, allowing the precipitated magnesium hydroxide to settle, and thereafter separating the settled precipitate from the supernatant liquid. No. 2,255,422. Sheldon B. Heath and Raymond J. Anderson to The Dow Chemical Co.

Aryloxy-Tetrahydronaphthalenes. No. 2,255,434. Clarence L. Moyle to The Dow Chemical Co.

Production of Sulphuric Acid and iron oxide from water pickling acid No. 2,255,445. Douglas R. Clarkson to Ella Van Gorder.

A Secondary-butyl-lower Alkali-malonic Acid-mono-amide-lower alkyl ester. No. 2,255,447. Walter Kropp to Winthrop Chemical Co.

Production of Sulfur Trioxide from ferrous sulfate and oxygen. Apparatus. No. 2,255,539. Douglas R. Clarkson to Ella Van Gorder.

Meltable Wax-like Composition comprising at least 20% by weight of wax and the balance composed largely of a condensation derivative of rubber obtainable by decomposing with water a product obtained by treating rubber in solution with chlorostannic acid or a halide of an amphoteric metal. No. 2,255,564. Erich Gebauer-Fuelnegg, Louis K. Eilers and Eugene W. Moffett to Marbon Corp.

Method of Inhibiting the Catalytic Deterioration of an organic substance normally caused by copper and its compounds in the presence of oxygen. No. 2,255,597. Frederick B. Downing and Charles J. Pedersen to E. I. du Pont de Nemours & Co.

Converting Allyl Chloride to 1-chloro, 3-bromo propane, comprising dissolving water in allyl chloride which has been aged not less than a week and treating the resulting substance with hydrogen bromide in the presence of a catalyst selected from the group consisting of the chlorides, bromides and iodides of the heavy metals of the fifth group of the periodic series. No. 2,255,605. Robert E. Windecker and Anton Schormuller.

Synthetic Hydrated Iron Oxides. Method of production. No. 2,255,607. Joseph W. Ayers and George Plews, to C. K. Williams & Co.

Alkylation with chlorosulfonic acid. No. 2,255,610. William E. Bradley to Union Oil Co.

Inhibiting Clouding of Liquid Potassium Cocoanut Oil Soap during storage of the soap in glass containers which comprises removing the insoluble calcium and magnesium compounds by filtering the soap solution and thereafter adding to the soap from 1% to 2% sodium hexametaphosphate, based upon the total soap content of the solution. No. 2,255,629. Harry L. Roschen to Industrial Patents Corp.

Silver Halide Photographic developer containing at least one silver halide developing agent a soluble sulfite and an effective amount of an amidine salt of an aminobenzoic acid. No. 2,255,731. Garnet P. Ham and Robert B. Barnes to American Cyanamid Company.

Tetrachlorethylene. Process for producing comprises passing a mixture of acetylene and chlorine over contact surfaces at a temperature of 300-400°C. in the presence of a gas which is inert to the reaction and in the absence of water. No. 2,255,752. George Basel and Erich Schaeffer to Dr. Alexander Wacker Geselschaft fur Elektrochemische Industrie G m.b. H,

Electrolyte for electrolytic condensers, comprising the reaction product of hydrogenated rosin, an alkali and a plasticizer. No. 2,255,817. Samuel Ruben.

Method of Preparing Methyl Vinyl Ketone which comprises acetylating 3-chlor-2-butanone and pyrolyzing the resulting product to obtain the methyl vinyl ketone. No. 2,256,149. John R. Long to Wingfoot Corp.

Acetylene from Hydrocarbons, process of producing. No. 2,256,174. Heinrich Schilling and Ludwig Heer to Jasco, Inc.

Quarternary Nitrogen Compounds. No. 2,256,186. Gerhard Balle and Karl Horst to General Aniline & Film Corp.

Method of Purifying Diphenylamine comprises treating freshly granulated diphenylamine with an organic solvent for the substances causing discoloration of diphenylamine, but which possesses a limited solubility for diphenylamine said solvent being selected from the group consisting of the alcohols and hydrocarbons, said solvent being brought into intimate contact with the surface of the grains of diphenylamine for a time sufficient to dissolve the adsorbed impurities thereon, and separating the grains from the solvent. No. 2,256,196. William F. Filbert to E. I. du Pont de Nemours & Co.

Gas Mixture. Process of obtaining a mixture of carbon monoxide and hydrogen in controlled proportions. No. 2,256,333. William D. Wilcox, to Le Roy J. Snyder, James V. Richards and Henry M. Wilcox.

Synthetic Drying Oil consisting of the reaction products of a hydroxylated compound of a drying oil acid having at least two hydroxyl groups esterified with at least two molecules of drying oil acid for each molecule of such hydroxylated compound such product being characterized by the fact that it has a number of double bonds per molecule at least approximately equal to the aggregate number of double bonds in said last specified drying oil acid molecules. No. 2,256,353. Alfred E. Rheineck and James S. Long to Devoe & Raynolds Co., Inc.

Denatured Ethyl Alcohol containing as an essential denaturing agent from 0.01 to 10% by volume of a substance selected from the group consisting of nitromethane, nitroethane, 1-nitropropane and 2-nitropropane. No. 2,256,368. John C. Woodhouse to E. I. du Pont de Nemours & Co.

Separation of Air into component gases by liquefaction and rectification. No. 2,256,421. Philipp Borchardt to Gesellschaft fur Linde's Eismaschinen A. G.

Purification and concentration of formaldehyde solutions. Process of obtaining substantially pure methanol from a solution consisting essentially of formaldehyde, methanol and water by means of a fractionating column. No. 2,256,497. Blythe M. Reynolds to Heyden Chemical Corp.

Material for use as a polisher, a cleanser, a purifier, a catalyst or a catalyst carrier or other uses comprising a fine grained, non-toxic non-staining material resulting from the heat treatment of a batch of kaolinic clay. No. 2,256,528. Louis F. Rowe, Carl G. Silverberg and Alexis G. Pincus to American Optical Co.

Manufacture of alkali metal salts of alkyl-acrylic acids comprising heating an alkyl-acrolein with a strong solution of alkali metal hydroxide to form the alkali metal salt of the alkyl-acrylic acid. No. 2,256,544. Joseph E. Bludworth to Celanese Corp.

Alkyl Aryl Sulfonates. Process for production. No. 2,256,610. Hyym E. Buc to Standard Oil Development Co.

In process of defleurage of a naphthenic mineral oil containing ethereal oils, the step of treating the naphthenic mineral oil with 80 to 90% alcohol to extract the ethereal oils. No. 2,256,772. Werner Freudenberg to Thomas Young Nurseries, Inc.

Process for producing an alkali alum which comprises reacting an alkali chloride with substantially twice the quantity of sulfuric acid necessary to produce the bisulfate, heating the reaction mixture by the injection of steam, thus producing a reaction mixture consisting of an alkali bisulfate and free sulfuric acid and aqueous hydrochloric acid, reacting the mixture of sulfuric acid and bisulfate with sufficient aluminous material to form the alum, the sulfuric acid being maintained in such concentration during the first reaction that substantially all the hydrochloric acid formed is removed before the reaction of the mixture with the aluminous material. No. 2,256,790. Robert E. Rennell.

1,1-dichloro-1-nitro-paraffins and process of making them. No. 2,256,839. Henry B. Hass and Barney R. Strickland to Purdue Research Foundation.

Method increasing active surface of an aluminum electrode by chemical agency. comprising the steps of placing the electrode in an etching solution, and maintaining the solution at a temperature above its freezing temperature and below 8°C. No. 2,256,860. Anthony F. P. J. Claassen and Johan D. de Vries to Hartford National Bank & Trust Co.

Salts of sulfonated higher aliphatic alcohols having at least 8 carbon atoms in the molecule with strong organic bases and use thereof. No. 2,256,877. Heinrich Bertsch to American Hyalsol Corp.

Process stabilizing bituminous emulsion having an aqueous phase with an alkalinity greater than about pH 11.5 which comprises adding unsaponified Vinsol resin thereto and thereby reducing the alkalinity of said emulsion to a pH of approximately 8.5 to 10 by partial reaction with said unsaponified resin to produce a stable emulsion having improved drying properties. No. 2,256,886. Walter D. Buckley to American Bitumuls Co.

Nypohalite of a compound of the group consisting of lower aliphatic araliphatic and aryl-aliphatic quaternary ammonium hydroxides. No. 2,256,958. Irving E. Muskat to Pittsburgh Plate Glass Co.

Hypochlorite of quaternary ammonium hydroxide and production thereof. No. 2,256,959. Irving E. Muskat to Pittsburgh Plate Glass Co.

Continuous cyclic process for extracting carbon dioxide from flue gases. No. 2,256,962. Gustave T. Reich.

Method for control of temperature in catalytic exothermic reactions. No. 2,256,969. Frank T. Barr to Standard Oil Development Co.

Process of producing nitrated organic compounds stable in the presence of hot sulfuric acid, which process comprises reacting with a sulfuric acid-nitric acid mixture, a nitratable organic compound capable of utilizing and sufficient in amount to utilize, the nitric acid content to the acid substantially completely to form a nitrated compound and utilizing the resultant heat to aid in concentration of the residual sulfuric acid toward its original concentration. No. 2,256,999. James B. Castner to E. I. du Pont de Nemours & Co.

Reaction products of vanadium pentoxide and ethers of ethylene glycol. No. 2,257,009. William H. Hill to American Cyanamid Co.

Patch process for liquating zinc from zinciferous material of the type of zinc dust and trass containing elemental zinc. No. 2,257,085. Johannes Thede to Stolberger Zink Aktiengesellschaft fur Gergbau und Huttenbetrieb.

Leather

Artificial Leather Substitute. No. 2,256,034. Carl L. Nottebohm to Carl Freudenberg.

Method and Device for Treating Strips of Whale Blubber having a convex side carrying a layer of black pigment, said method comprising the steps of bending successively said strip in the direction of said convex side to provide flat transverse surfaces at the line of the bend, and milling each of said transverse surfaces to remove said layer of black pigment. No. 2,255,207. Philipp L. Fauth to Fauth Patent A.-G.

Metals, Alloys

Copper Plating Process which comprises electrolyzing a copper alkali metal cyanide solution to which has been added from 0.01 to not more than 1 ounce per gallon of a betaine having at least one non-cyclic hydrocarbon radical which contains 10 to 20 atoms. No. 2,255,057. Donald A. Holt to E. I. du Pont de Nemours & Co.

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Method Making a Composite Metal Slab which consists in directing a combustible gas containing a vaporized flux onto the upper surface of the slab and then applying a second metal in solid, finely divided form onto said slab. No. 2,255,076. Charles A. Medsker and Menahem Merlub-Sobel to William L. Ulmer.

Silver-graphite Electric contact element having one surface from which the graphite has been oxidized to leave a readily weldable silver face. No. 2,255,120. Edwin F. Kiefer and Erle I. Shobert to Stackpole Carbon Co.

Free-flowing Brass Powder of relatively high apparent density comprising rounded particles produced by atomizing molten brass containing from about 0.05% to about 1% phosphorus. No. 2,255,-204. George E. Best to The New Jersey Zinc Co.

Method of Preparing Selenium for Electrical Uses which comprises dissolving the selenium in nitric acid, filtering off the insoluble residue, drying the filtrate, dissolving the dried filtrate in an ammoniacal solution adding hydrochloric acid to such ammoniacal solution until the resultant solution is acid, precipitating the selenium with sulfur dioxide washing the precipitated selenium agglomerating the precipitated selenium and boiling it before use, applying the selenium to a base plate with a suitable heat treatment and aging the selenium coated plate at room temperature. No. 2,255,-358. Lloyd R. Jackson and Wendell F. Stewart to Battelle Memorial Institute.

Method Producing Carbon-containing Ferrous Metal Articles having surfaces containing diffused chromium, which comprises substantially suppressing the migration of carbon, by including in quantity sufficient to bind all the carbon, a carbon-binding alloy element of greater affinity for carbon than chromium in a carbon-containing ferrous metal composition in which the carbon content in per cent multiplied by the thickness of the article in millimeters exceeds 0.12, producing from such composition the ferrous metal article, and diffusing chromium into the surface of article. No. 2,255,-482. Karl Daeves, Gottfired Becker and Fritz Steinberg.

Method for Producing Metals such as aluminum, beryllium, chromium, magnesium, and alloys of these metals. No. 2,255,549. Osias Kruh.

Molybdenite. Process of recovering by froth flotation. No. 2,255,-776. Thomas A. Janney, Alpha G. Johnson and Charles M. Nokes.

Nickel-base Alloy containing from about 0.01% to about 0.2% of alkaline earth metal about 0.01% to about 0.25% of at least one element from the group consisting of phosphorus, arsenic and antimony, and characterized by high workability compared to a similar alloy free from phosphorus, arsenic or antimony. No. 2,255,895. Leonard Bessemer Pfeil to The International Nickel Co., Inc.

Ferrous Alloys. No. 2,256,135 to 2,256,138. Arthur T. Cape and Charles V. Foerster to Coast Metals, Inc.

Method of Producing a Light Metal. No. 2,256,161. Joseph D. Hanawalt and John S. Peake to The Dow Chemical Co.

Method of treating copper and product thereof. No. 2,257,492. Albert J. Phillips, Albert A. Smith, Jr. and John S. Smart, Jr., to American Smelting and Refining Co.

Concentrating of chromium-bearing ores. No. 2,256,536. Marvin J. Udy.

Malleable Cast Iron. Method of making. No. 2,256,674. Anthony M. Herrmann to Belle City Malleable Iron Co.

Method of coating articles by cathode disintegration. No. 2,256,771. Bernhard Berghaus and Wilhelm Burkhardt.

Copper-zinc alloy. No. 2,256,788. Wolf J. Muller and Moritz Niessner to Aktiengesellschaft Dynamit Nobel.

Production of ferroalloys. No. 2,256,901. Gunnar Horgard to William Bell Arness and Oliver Smalley.

Method of making wool from aluminum which consists of forming thin elongated cuttings from a starting body of the material, and then without working the resulting wool, raising its temperature above 500°F. sufficiently to remove the work hardening effect resulting from the cutting operation. No. 2,256,923. Charles E. Galvin.

Hydrocarbon conversion process for the production of high octane fuel. No. 2,255,843. Don R. Carmody and Alex G. Oblad, to Standard Oil Co.

Cracked petroleum distillate fuel unstable to oxidation containing a small proportion of an ester of a phosphorous acid. No. 2,256,187. Thomas W. Bartram to Monsanto Chemical Co.

Process recovering normally gaseous petroleum hydrocarbons, including propane from a gas mixture by absorption. No. 2,256,405. Wallace A. McMillan to The Texas Company.

Mineral Oil composition and improving agent therefor. Nos. 2,256,441 and 2,256,442. Orland M. Reiff to Socony-Vacuum Oil Co., Inc.

Lubricant composition and improving agent therefor. No. 2,256,443. Orland M. Reiff to Socony-Vacuum Oil Co., Inc.

Alkylation of isoparaffins with olefins, comprises treating olefins and an excess of low boiling isoparaffins with strong sulfuric acid, whereby the isoparaffins are alkylated by the olefins, separating the used acid from the reaction products separately contacting at least a portion of the used acid with substantially olefin-free isoparaffins to strip the acid of absorbed olefins and passing the mixture of isoparaffins and hydrocarbons stripped from the acid to the alkylation operation No. 2,256,450. Arthur R. Goldsby, Ernest F. Pevere, Louis A. Clarke and George B. Hatch to The Texas Co.

Alkylation process for production of normally liquid, branched chain paraffinic hydrocarbons by reacting at least one isoparaffin with at least one monoolefin in the presence of concentrated sulfuric acid under suitable alkylation reaction conditions. No. 2,256,615. Fred Hederhorst to Standard Oil Development Co.

Production of motor fuels comprising cracking a petroleum oil under a total pressure in the range above about 750 pounds per square inch and under an oil partial pressure of less than about 250 pounds per square inch, separating the cracked product boiling in the motor fuel boiling range and contacting the same with bauxite under substantially non-cracking conditions at a temperature in the range above 600° F. No. 2,256,621. Eger V. Murphree to Standard Oil Development Co.

In process for manufacture of hydrocarbons containing more than one carbon atom in the molecule from oxides of carbon and hydrogen, the method of controlling the reaction temperature which comprises passing a synthesis gas mixture comprising oxides of carbon and hydrogen under synthesizing conditions through a plurality of alternate catalyst reacting and cooling zones, passing a suitable cooling liquid through the respective cooling zones, and contacting the gases with said cooling liquid to maintain the temperature of the same within a predetermined temperature range. No. 2,256,622. Eger V. Murphree and Edward B. Peck to Standard Oil Development Co.

Motor fuel comprising a major proportion of gasoline hydrocarbons and an unsaturated ether selected from the group consisting of divinyl ether and dimethallyl ether blended with said hydrocarbons in a minor but effective octane improving amount. No. 2,256,627. Raphael Rosen to Standard Oil Development Co.

Stabilizing Gasoline. An oxidation and gum inhibitor for cracked gasoline comprising a mixture of phenolic components of cracked petroleum naphtha and phenolates thereof produced by reacting about 3 to 12 parts by weight of said phenolic components with 1 part of an aliphatic polyamine. No. 2,256,753. Walter W. Scheumann to Citis Service Oil Co.

Continuous process for alkylating isoparaffin hydrocarbons with olefin hydrocarbons by contact with a liquid alkylation catalyst. No. 2,256,880. Arthur R. Goldsby and John C. Van Gundy to Texaco Development Corp.

Manufacture of high antiknock hydrocarbons. Arthur R. Goldsby to The Texas Co.

Motor fuel. No. 2,257,079. LeRoy G. Story to The Texas Co.

Process for dehydrogenation of normally gaseous hydrocarbons of 2 to 4 carbon atoms and low boiling normally liquid hydrocarbons to form olefins. No. 2,257,082. Willis A. Yarnall to The Texas Co.

Paint, Pigments

A pigment the individual particles of which are coated with from 0.05 to 0.5% of a water sensitive coating agent, and from 0.05 to 0.5% of a water-repellant coating agent, the agents being present in such proportions that the pigment is wet preferentially by oil on agitation in an oil-water system. No. 2,255,263. Guy C. Marcot to Interchemical Corporation.

Grease resistant paper having a coating consisting of a mixture of clay, polyvinyl alcohol and thin boiling cooked corn starch in substantially the following proportions by percentage: clay 87.7%, polyvinyl alcohol 1.3%, thin boiling cooked corn starch 11.0%. No. 2,256,853. George L. Schwartz to E. I. du Pont de Nemours & Co.

Petroleum

Hydrocarbon treatment for production of clean distillate stock from liquid or liquefiable heavy hydrocarbons. No. 2,255,060. Eugene J. Houdry to Houdry Process Corp.

Lubricating composition comprising a major proportion of mineral lubricating oil and a minor proportion of a halogen and oxygen-bearing compound of the class consisting of halogen-bearing aromatic acids and halogen-bearing salts of aromatic acids. No. 2,255,085. Carl F. Prutton and Albert K. Smith to The Lubri-Zol Development Corp.

Polymerization of refinery unsaturates and preparation of improved motor fuels. No. 2,255,275. Eldon E. Stahly to Standard Oil Development Co.

Method of refining a petroleum oil for the production of improved lubricating oils. No. 2,255,282. Henry O. Forrest to Standard Oil Co.

Process for treating oils. No. 2,255,394. Walter A. Schulze to Phillips Petroleum Co.

Conversion of hydrocarbon gases and liquids into gasoline-like fractions having high anti-knock characteristics. No. 2,255,399. Philip Subkow and Robert E. Haylett to Union Oil Co. of Calif.

Resins, Plastics

Process of making a hardened light-colored resinous product which comprises reacting an ethylene-alpha-beta dicarboxylic acid with a glycol. No. 2,255,313. Carleton Ellis to Ellis-Foster Co.

Cyclopentadiene resin. No. 2,255,409. William H. Carmody to The Neville Co.

Sweetening a sour petroleum hydrocarbon oil containing mercaptans, which comprises converting the mercaptans into oil-soluble mercaptides of a heavy metal, and thereafter treating the oil containing said mercaptides in liquid phase with a salt of a halogenated monocarboxylic acid, reacting said salt with the mercaptides to form oil-insoluble derivatives, and removing said derivatives from the oil. No. 2,255,417. Carleton Ellis, Thomas C. Whitner, and Wilbur V. Keegan to Standard Oil Development Co.

Polymerizable composition consisting of monomeric methyl methacrylate having incorporated therein isoascorbic acid in an amount sufficient to inhibit the polymerization of the said methacrylate. No. 2,255,483. Gaetano F. D'Alelio to General Electric Co.

Solid synthetic resinous product consisting essentially of polyvinyl halide and an oxide of the class consisting of phenoxy propene oxide secondary amyl phenoxy propene oxide and p-tertiary amyl phenoxy propene oxide, the product containing 50-60% by weight of polyvinyl halide and oxide in quantity sufficient to plasticize said polyvinyl halide and impart elasticity and thermal stability to said product. No. 2,255,487. Roy C. Feagin and James G. E. Wright to General Electric Company.

Plastic comprising a co-polymer of an incompletely polymerized chloroprene and a synthetic resin, the synthetic resin acting to controllably reduce the elongation or stretch of the chloroprene. No. 2,255,891. Joseph N. Kuzmick and Lamar S. Hilton to Raybestos-Manhattan, Inc.

Light Polarizing Material. Process of producing from plastic sheet. No. 2,255,940. Howard G. Rogers to Polaroid Corp.

Plasticizer. Composition comprising a thermosetting formaldehyde-urea reaction product and a plasticizer which has a melting point of about 173° C. and which is substantially identical with the substance obtained by adding 125 parts of substantially water-free triethanolamine to 265 parts of pyridine, then adding 159 parts of paratoluene sulfonyl chloride gradually with agitation, cooling the

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liquid to remove the heat generated by the reaction, then stopping the cooling and continuing the agitation until the temperature of the liquid has risen to 20° C., followed by addition of methanol to cause precipitation, filtering off and drying the precipitate, dissolving it in water, adding a small amount of triethanolamine to the water solution and crystallizing said substance from the solution. No. 2,255,995. Rex P. Cosgrove to Plaskon Co.

Hardened Plastic Articles. Method of making. No. 2,255,998. Arthur M. Howald and Leonard S. Meyer to Plaskon Co.

Method preparing copolymers which comprises polymerizing a mixture of at least two monomers each containing an ethylenic linkage and at least one containing conjugated double bonds in the presence of a chloropropionitrile. No. 2,256,148. Joy G. Lichty to Wingfoot Corp.

As new synthetic resin, the product of the conjoint polymerization of styrene and between about 0.1 and about 5.0% by weight of 2-methyl acrolein, being a clear, hard, resinous solid. No. 2,256,152. Howard S. Nutting and Peter S. Petrie to The Dow Chemical Co.

Method polymerizing a vinyl aromatic compound to produce an article of desired shape which comprises polymerizing the compound at a temperature above 100° C. until the polymerization is from 50-85% complete, to obtain a product which is sufficiently plastic to permit shaping of the same at temperatures not greatly higher than 100° C. and is sufficiently solid to retain its shape at room temperature shaping the partially polymerized material and completing the polymerization. No. 2,256,160. Edgar C. Britton and Walter J. Le Fevre to The Dow Chemical Co.

Manufacture of plastic masses from a urea and formaldehyde and containing protein material comprises causing a urea and a molecular excess of formaldehyde to react upon each other without external heating in an aqueous ammoniacal solution which is weakly alkaline toward litmus, acidifying the reaction mixture until it is weakly acid toward litmus, mixing the same with a protein material and thereafter drying the reaction mixture. No. 2,256,253. Oscar Neuss.

Plasticized aminoplast. No. 2,256,278. Gaetano F. D'Alelio to General Electric Co.

Infusible reaction product of a fusible anacardic material and an organic nitro-compound, said nitro-compound being sufficiently thermo-stable to permit its being heated per se to its boiling point at atmospheric pressure without exploding or otherwise undergoing appreciable decomposition. No. 2,256,349. Emil E. Novotny and George K. Vogelsang to Durite Plastics, Inc.

Maleic anhydride-polyhydric alcohol-natural resin reaction products. No. 2,256,444. Israel Rosenblum.

Synthetic Spongy Material. Polymer of ethylene in porous spongy form, said polymer of ethylene corresponding in composition to $(CH_2)x$ and showing by X-ray diffraction analysis a crystalline structure. No. 2,256,483. Frederick L. Johnson to E. I. du Pont de Nemours & Co.

In operations of mechanical working and forming of shaped structural articles from fusible solid materials, the step which comprises bringing between surfaces of the article being processed and the shaping apparatus that tends to contact with said article a non-staining oil composition comprising high molecular weight polymeric homologous compounds characterized by structures of long chains of saturated carbon atoms of which a number have a carbon to carbon link to a recurring organic radical. No. 2,256,603. Donald L. Wright to Standard Oil Development Co.

Stabilized Vinyl Resin. Composition resistant to deterioration effects of heat comprising an artificial thermoplastic resin, including a vinyl polymerized therein, intimately combined with a small amount of stabilizing compound of the formula R-O-X-O-R where X is an alkaline earth metal and R is one of the group of aliphatic and aromatic univalent hydrocarbon radicals. No. 2,256,625. William M. Quattlebaum, Jr., to Carbide & Carbon Chemicals Corp.

Casein Plastics. Method and apparatus for making. No. 2,257,067. John A. Parsons to American Plastics Corp.

Molding process for casein plastics. No. 2,257,068. John A. Parsons to American Plastics Corp.

Process for preparing a refined solution of a resin-forming unsaturated light oil hydrocarbon. No. 2,257,078. Frank J. Soday to The United Gas Improvement Co.

Plastic composition of matter comprising aqueous dispersion of rubber, a filler of discrete masses of friable particles containing mainly expanded mica and bentonite in amount by volume equal substantially to the volume of the aqueous rubber-dispersion, the proportion of mica to bentonite being in the neighborhood of 20 to 1 and a coagulant for the rubber dispersion. No. 2,257,083. Malcolm R. Buffington to Rubber Associates, Inc.

Rubber

Organic compound for vulcanization of rubber. No. 2,256,157. George W. Watt to Wingfoot Corp.

Tube of multi-ply, curled rubber hydrochloride film. No. 2,256,159. Foster J. Young to Wingfoot Corp.

Antioxidants for Rubber. Compounds selected from the class consisting of N-phenyl-N'-cyclohexyl-p-phenylene diamine and N-naphthyl-N'-cyclohexyl-p-phenylene diamine. No. 2,256,189. Max Bogemann, Otto Bayer, Rudolf Schroter and Hans Pohle to General Aniline & Film Corp.

Method improving adhesion of rubber to cotton which comprises applying to the cotton a shellac-amine soap, associating the treated cotton with vulcanizable rubber, and vulcanizing the assemblage. No. 2,256,194. Richard A. Crawford to B. F. Goodrich Co.

Textiles

Inhibiting gas fading of dyed acetate silk. No. 2,255,090. John M. Tinker and Donovan E. Kvalnes to E. I. duPont de Nemours & Co.

Process for dyeing textile materials, containing an organic derivative of cellulose, which comprises treating the organic derivative of cellulose material with a suitable diazotizable base, diazotizing, coupling the same on the fiber with arylamide of a hydroxy carboxylic acid, said arylamide being capable of coupling, and subjecting the material to reduction and steaming, said reduction being insufficiently vigorous to effect discharge of the dye. No. 2,255,130. George W. Seymour and George C. Ward to Calanese Corp.

Artificial textile treatment. In process wherein artificial filaments, yarns and similar materials having a basis of an organic derivative of cellulose have their ability to absorb moisture reduced by stretching in the presence of hot water, steam or organic solvents or swelling agents, the step of restoring the ability to absorb moisture which comprises incorporating a plasticizer in the materials after they have been subjected to the stretching operation but before they are subjected to a fabric-forming operation. No. 2,255,766. Henry Dreyfus.

Glazed chintz. Process of preparing comprises treating a chintz material with a sufficient amount of an aqueous solution including a triethanolamine salt of phthalic acid as an accelerator of the delayed action type and a thermosetting resin containing the condensation products of formaldehyde with melamine to provide a concentration of resin solids in the treated cloth between about 5% and 25% by weight adjusting the moisture content to about 5-15% glazing the material and curing the thermosetting resin with heat. No. 2,255,901. Paul C. Shroy to American Cyanamid Co.

Yarn conditioning process and composition therefor. No. 2,256,112. Joseph B. Dickey to Eastman Kodak Co.

Yarn conditioning process and composition therefor. No. 2,256,112. component a surface-active agent consisting of a compound prepared by reacting a hydroxy alkylated derivative of a carbohydrate with an agent selected from the group consisting of phosphating and phosphiting agents. No. 2,256,381. Joseph B. Dickey to Eastman Kodak Co.

Cellulosic spinning solution for the production of cellulosic shapes containing, in an amount insufficient to change the preceptible general characteristics of the shape, of the order of less than 1200 parts per million parts of the shape, a material by which the shape may be identified comprising an oxide of a member selected from the group consisting of beryllium, zirconium, bismuth, tantalum, chromium, molybdenum and tungsten. No. 2,256,549. Benjamin W. Collins to American Viscose Corp.

Resist printing paste for the production of resist effects on oxidation colors comprising a thickener and a hydroxylated aliphatic polyamine free from amino-substituents other than alkyl radicals, aralkyl radicals and hydroxyalkyl radicals. No. 2,256,809. Jean G. Kern to National Aniline & Chem. Co., Inc.

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Abstracts of Foreign Patents

Collected from Original Sources and Edited

Those making use of this summary should keep in mind the following facts:

Belgian and Canadian patents are not printed. Photostats of the former and certified typewritten copies of the latter may be obtained from the respective Patent Offices.

English *Complete Specifications Accepted* and French patents are printed, and copies may be obtained from the respective Patent Offices.

In spite of present conditions, copies of all patents reported are obtainable, and will be supplied at reasonable cost.

This digest presents the latest available data, but reflects the usual delays in transportation and printing. We expect to begin reporting German patents in the near future. Your comments and criticisms will be appreciated.

CANADIAN PATENTS

Granted and Published February 25, 1941. Continued from page 412, September, 1941

Method of making a tertiary amine by condensation of a primary aromatic amine and a hydrocarbon halide having the halogen attached to an aliphatic carbon atom. No. 394,842. The Frederick Post Company. (Walter M. Hinman and Walter G. Hollmann).

Process for concentrating dilute aqueous ethylene chlorhydrin solutions such as obtained by the action of chlorine water on ethylene. No. 394,847. Shell Development Company. (Willem Coltof).

An aliphatic secondary alkyl monoether of a glycerol wherein the secondary alkyl radical contains at least five carbon atoms. No. 394,848. Shell Development Company. (Theodore W. Evans and Edwin F. Bullard).

Process for the catalytic hydration of propylene by reaction with water at a temperature above 100°C under pressure greater than the vapor pressure of water at the operating temperature in the presence of a catalytic amount of aqueous sulfuric of 2 to 10% concentration. No. 394,849. Shell Development Co. (Franklin A. Bent, Russell W. Millar and Simon N. Wik).

Production of beta-ionylidene-acetaldehyde. No. 394,872. Winthrop Chemical Co., Inc. (Richard Kuhn and Colin J. O. R. Morris).

Refractory gas impervious material consisting of at least 94% silica, at least 2.5% thoria and from 2-2.5% of one or more oxides from the group consisting of zirconia, calcium oxide and beryllia. No. 394,873. Canadian General Electric Company Limited. (Marcello Pirani and John H. Partridge).

Process for improving the resilience of filaments, fibres, yarns, fabrics and like materials having a basis of organic derivative of cellulose. No. 394,876. Henry Dreyfus. (Donald Finlayson and Richard G. Perry).

Process for the treatment with liquid media of yarns or similar textile materials in compact package form. No. 394,877. Henry Dreyfus. (George H. Ellis).

Extracting precious metals by saturating a batch of the material containing the metal, adding caustic soda and mercury, and agitating the mass. No. 394,878. Myrta F. LaChance, Ammon K. Thurston, Howard G. Crissman and Harry W. Tustison. (Charles R. Hauke).

Metallurgical furnace. No. 394,881. Albin G. Witting.

Method of producing compounds of nucleotides and their organic hydrolytic decomposition products which contain a pyrimidine ring in their molecule. No. 394,883. Simon L. Ruskin.

Process for converting acetylene into monovinyl acetylene by passing acetylene in contact with an unfused alkali hydroxide catalyst at a temperature of 100-300°C. No. 394,884. Consortium für Elektrochemische Industrie G.m.b.H. (Paul Helbig, Emil Reiter and Friedrich Stadler).

High molecular sulfur containing plastic obtainable by causing water soluble sulfides to react upon acetals, mercaptals or mercaptols which contain at least 2 replaceable negative radicals. No. 394,888. Rudolf Schröter and Wilhelm Becker.

Granted and Published March 4, 1941

Method for the direct introduction into an aromatic ring of a diazo linkage -N=N-. No. 394,892. Walker M. Hinman and Walter G. Hollmann.

Chromium plate imperforate zinc plate for printing purposes. No. 394,924. John J. Murray.

Process of making rubber thread having a high modulus or high rigidity. No. 394,928. Thomas Lewis Shepherd.

Method of stabilizing a black lacquer containing carbon black, nitrocellulose and a copper soap. No. 394,947. Binney & Smith Company. (Max R. Vogel).

Process of dispersing pigments in resin vehicles by grinding pigments with solid, plastic, water insoluble resins in the presence of a stable organic amine containing a plurality of unsubstituted $-NH_2$ groups. No. 394,948. Binney & Smith Company. (Max R. Vogel).

Pigmented cellulose ether base comprising a pigment uniformly massed and mechanically worked with a cellulose ether, a plasticizer and a long chain fatty acid salt of a metal of the group consisting of calcium, barium and strontium, which salt serves as a dispersing agent which is insoluble in the plastic cellulose ether mass. No. 394,949. Binney & Smith Company. (Robert L. Zapp).

Carbon black pigmented cellulose ether base comprising a ground intermixture of carbon black with a plasticized cellulose ether and a nickel soap dispersing agent soluble in the cellulose ether mass. No. 394,950. Binney & Smith Company. (Robert L. Zapp).

Process for refining crude antimony metal. No. 394,962. The Consolidated Mining & Smelting Company of Canada Limited. (Arthur H. W. Busby and Frederick C. Ransom).

Making magnesium by heating together silicon carbide and a magnesium oxide containing material to a temperature capable of liberating magnesium. No. 394,971. The Dow Chemical Company. (Charles E. Nelson and John S. Peake).

Quick setting adhesive comprising heated emulsified mixture of about 7 parts by weight of aqueous glue solution, 3 to 9 parts by weight of a solution of a vinyl resin in an organic solvent, and up to 6 parts by weight of a plasticizing material such as glycerine. No. 394,976. The Gardner-Richardson Company. (Harry C. Fisher and James F. Thompson).

Concentrating vitamin D by dissolving the vitamin containing material in an organic solvent, passing the solution through a mass of activated tricalcium phosphate, washing the phosphate with an organic solvent to desorb the phosphate, and then separating the vitamin D from the solvent by distillation. No. 394,978. General Mills, Inc. (Sidney E. Miller).

Process for purifying and refining animal and vegetable oils and fats and removing colloidal or dissolved metals therefrom. No. 394,979. General Mills, Inc. (Jakob L. Jakobsen).

Apparatus for continuously treating vapors of solids. No. 394,980. General Mills, Inc. (Lester F. Borchardt).

Method of treating pancreatin to reduce the bacterial and mould count thereof and preserve activity therein. No. 394,981. The Griffith Laboratories Limited. (Carroll L. Griffith and Lloys A. Hall).

Treating tobacco to increase its moisture content by placing it under a vacuum and then introducing a mixture of steam and water. No. 394,982. The Guardite Corporation. (Horace L. Smith, Jr. and Lucian N. Jones).

Obtaining crease-resistant cellulosic textile material which has a soft handle and resistance to soap-washing and dry-cleaning. No. 394,987. Imperial Chemical Industries Limited. (John G. Evans).

Preparing gelatinous material from gelatinous stock by treating the stock with an alkaline solution containing a water soluble soap, separating the alkaline solution from the stock, and extracting the gelatinous material from the treated stock. No. 394,989. Industrial Patents Corporation. (Edward F. Christopher).

Method of impregnating silk hosiery with substances adapted to proteinize it. No. 394,991. The Institute of Paper Chemistry. (Otto Kress and Charles E. Johnson).

Process of producing adherent blackish uniformly colored oxide coatings on rolled products of nickel alloys. No. 394,993. The International Nickel Company, Inc. (Carl G. Crocker, Gorham K. Crosby and Robert R. Clappier).

Method of producing a standardized plastic creamery product having a given butterfat content. No. 395,001. Milk Processes, Inc. (Lawrence P. Sharples).

Process for producing butter. No. 395,011. Research Corporation. (Peter A. van der Meulen and David Levowitz).

Superficially coloring solid material by coating with a pigment, applying an emulsion comprising bitumen in water to the surface, and removing the water of the emulsion, the amount of emulsion being such that the resulting film of bitumen is translucent. No. 395,013. Shell Development Company. (Hanns Mittler).

Hydroxylated-2-aryl-pseudonaphthazimide. No. 395,017. Society of Chemical Industry in Basle. (Gérald Bonhôte and Carl Apotheker).

Process for producing therapeutically active compounds (such as dihydroxylated aminoarsenobenzene) which are readily soluble in water, have a high non-toxicity, and show very little irritating effect when injected subcutaneously. No. 395,027. Winthrop Chemical Company, Inc. (Alfred Fehrle and Paul Fritzsche).

Producing of acid alkyl ester. No. 395,036. Winthrop Chemical Company, Inc. (Otto Eisleb).

Stabilized tasteless salt composition containing an alkaline earth salt of acetyl salicyclic acid and one or two per cent ammonium chloride. No. 395,040. Merck & Co., Inc. (Joseph R. Stevens).

Process of producing compounds of the formula $R.X.O(R_1O)nSO_3H$ wherein R is an aliphatic hydrocarbon radical of at least 3 carbon atoms, X is an aromatic radical of the group consisting of mononuclear and poly-nuclear radicals, R_1 is an aliphatic radical of the

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group consisting of hydrocarbon radicals and hydrocarbon radicals substituted by OH, n is a whole number, which comprises reacting a compound of the general formula $X.O(R_1O)nH$, the symbols having the same meaning as above stated, with a sulfonating agent in the presence of an olefine at a temperature between about -20°C and about 100°C. No. 395,042. Gerhard Balle and Karl Horst.

Granted and Published March 11, 1941

Production of styrene-free polymers of alpha-alkyl stryenes from a mixture of styrene and alpha-alkyl styrenes. No. 395,051. Herbert Muggleton Stanley and John Blair Dymock.

Smelting furnace lining. No. 395,069. John Ambrose Heskett.

Producing yeast of improved quality by adding to the **mash** phytin or phytin constituents. No. 395,087. Alfred Pollak.

Method of granulating crude calcium cyanamid. No. 395,104. American Cyanamid Company. (George E. Cox and Walter G. McBurney).

Separation and recovery of precious metals from sands, ores, etc., with the aid of a "bismuth series" metal alloy in presence of dilute cyanide solution. No. 395,114. Burton-Allen Gold Reclaiming Corporation. (Harry H. Burton).

Sintered compositions comprising 70% tungsten carbide, 15% tantalum carbide and 15% titanium carbide, said composition being made by admixing the powdered carbides and sintering at 1400-1700°C. No. 395,120. Canadian General Electric Company, Limited. (Walther Dawihl and Karl Schröter).

Preparing casein by forming the casein into a mist, subjecting said mist to the action of a mist-like precipitating agent, and separating the casein from the remaining liquid. No. 395,122. Canadian Gypsum Company Limited. (Elmer B. Oberg).

Method of separating a calcined titanium dioxide pigment into particles of different sizes. No. 395,123. Canadian Titanium Pigments Limited. (Walter K. Nelson).

Preparation of a composite titanium dioxide-calcium carbonate pigment. No. 395,124. Canadian Titanium Pigments Limited. (Louis E. Barton).

Alloy comprising up to 5% cobalt, up to 5% iron, up to 5% zirconium and the balance copper. No. 395,134. Canadian Westinghouse Company Limited. (James M. Kelly).

Alloy comprising about 0.5 to 3% cobalt, about 0.5 to 3% iron, up to 3% of metal selected from zinc and cadmium, and the balance substantially copper. No. 395,135. Canadian Westinghouse Company Limited. (James M. Kelly).

Detergent comprising beta methyl glycerine, one hydroxy group of which has been esterified by a long-chain fatty acid and another hydroxy group of which has been replaced by a sulfonate radical. No. 395,139. Colgate Palmolive-Peet Company. (Fred W. Muncie and Kenneth L. Russell).

Heat energizable adhesive composition capable of forming a high strength joint comprising a thermoplastic resin, cellulose nitrate and carnauba wax. No. 395,145. E. I. du Pont de Nemours & Co., Inc. (Earle C. Pitman).

Preparing chemical stable unbonded finely comminuted silicon alloy containing more than 35% silicon for use as constituent of alkaline coating compositions, by forming a thin superficial protective coating of oxide thereon by heating in an oxidizing atmosphere at between 300 and 1000°C for a time too short to cause oxidation of the major part of the alloy. No. 395,148. Electro Metallurgical Company of Canada Limited. (Ernest F. Doom).

High melting point alloy comprising granules having homo-heteroaxial crystal structure and containing at least about 25% of osmium and/or ruthenium. No. 395,153. Goldsmith Bros. Smelting & Refining Company. (Andrew R. Devereaux and Carl Pfanstiehl).

Process for the purification of carboxylic acid. No. 395,178. Shell Development Company. (Herbert P. A. Groll and Miroslav W. Tamele).

Process for the production of nitrile esters of open-chain saturated aliphatic compounds. No. 395,179. Shell Development Company. (Clyve Allen).

Process for the production of an ether from an olefine by contacting a paraffin olefine mixture with an aqueous mineral acid at a temperature and pressure at which an aqueous acid solution containing said ether is obtained. No. 395,180. Shell Development Company. (Charles F. Oldershaw).

Method of hydrolysing a derivative of polyvinyl alcohol by reacting it with an alcohol in presence of a hydrolysis catalyst. No. 395,216. Chemische Forschungsgesellschaft m.b.H. (Herbert Berg).

Producing diketen from keten by introducing keten into substantially undiluted diketen and polymerizing the keten in presence of the diketen while removing the reaction heat. No. 395,219. Consortium für Elektrochemische Industrie G.m.b.H. (Martin Mugdan and Johann Sixt).

Light sensitive material consisting of a sheet support carrying a light sensitive diazo compound and as coupling component a hydroxynaphthoimidazole. No. 395,221. Kalle & Co. A.G. (Maximilian P. Schmidt and Oskar Süs).

Improved process for producing isobutylene polymers having a molecular weight in excess of 1000 from hydrocarbon mixtures containing olefines mainly of 4 carbon atoms. No. 395,223. Standard Oil Development Company. (Helmuth G. Schneider).

Producing nitrogenous condensation products by causing alkylene imine containing at least one hydrogen atom attached to nitrogen, to react with an ester from an alcohol containing at least 6 carbon atoms in the molecular and an inorganic acid containing oxygen. No. 395,226. Heinrich Ulrich and Karlhugo Kuespert.

ENGLISH COMPLETE SPECIFICATIONS

Accepted and Published October 2, 1940

Refractory material. No. 526,414. P. B. Sillimanite Co., Ltd. et al.

Treatment of potatoes to produce dried mashed potatoes. No. 526,474. Potato Corporation of Idaho.

Absorption of bromine. No. 526,542. Imperial Chemical Industries Limited.

Fillers for vinyl resin plastics. No. 526,345. Carbide and Carbon Chemicals Corp.

Drying, conditioning and like apparatus. No. 526,346. W. W. Spooner.

Road covering material. No. 526,351. N. T. Anderson.

Manufacture of catalysts and the treatment of hydrocarbons therewith. No. 526,355. Standard Oil Development Company.

Manufacture of water soluble cellulose ethers. No. 526,370. Imperial Chemical Industries Limited.

Means for protecting respiration in a vitiated or rarefied atmosphere. No. 526,386. Bronzavia S. A.

Separation of butadiene from hydrocarbon mixtures containing same. No. 526,387. Dow Chemical Company.

Preparation of vitamin compositions. No. 526,389. Distillation Products, Inc.

Method of and means for producing high-pressure steam that is low in salt from saline feed water. No. 526,398. Schmidtsche Heissdampf Ges.

Obtaining cellulose for the manufacture of rayon from resinous pine woods. No. 526,399. F. C. Palazzo.

Apparatus for the manufacture of a composite yarn. No. 526,440. Lastex Yarn & Lactron Thread, Ltd. et al.

Manufacture of sugar derivatives of non-steroids having the effect of steroid hormones. No. 526,445. Society of Chemical Industry in Basle.

Apparatus for the separating of divided mineral oils. No. 526,449. A. Davies.

Method of producing neutrons. No. 526,544. Licentia Patent-Verwaltungs-Ges.

Manufacture of adhesives for the fabrication of laminated paper products. No. 526,462. Philadelphia Quartz Co.

Conversion of carbon monoxide with hydrogen into hydrocarbons. No. 526,465. N. V. Internationale Koolswaterstoffen Mij.

Soldering agent for soft-soldering aluminum and aluminum alloys. No. 526,471. J. Puppe.

Extraction and dewaxing of mineral oils. No. 526,477. Edeleanu Ges.

Water filtering device. No. 526,545. C. A. C. Carring.

Method and means for manufacturing briquettes, and more particularly charcoal briquettes. No. 526,491. F. M. Pettersson.

Recovery of salts from solutions used for gas purification. No. 526,492. Gas Light & Coke Co. et al.

Processes and apparatus for the manufacture of artificial sausage skins. No. 526,493. G. P. Huckfeldt & G. J. Huckfeldt.

Hydrogenation of adiponitrile. No. 526,495. E. I. du Pont de Nemours & Co., Inc.

Purification of nitriles. No. 526,496. E. I. du Pont de Nemours & Co., Inc

Manufacture of aliphatic amines. No. 526,497. E. I. du Pont de Nemours & Co., Inc.

Manufacture of hard or highly viscous insulating materials. Nos. 526,510 and 526,511. W. T. Henley's Telegraph Works Co., Ltd. et al.

Method for producing preparations for intravenous use or for the treatment of arthritis and fibrosis, and the preparation resulting therefrom. No. 526,513. Armour & Company.

Method of making ductile laminated metal. No. 526,525. Reynolds Metals Co.

Manufacture of stabilized preparations of sulfuric anhydride. No. 526,555. Société Rhodiaceta.

Process of manufacture of a homogeneous flexible material by impregnation. No. 526,556. G. H. Vulliet-Durand.

Process for the manufacture of cellular substances with closed, gas-tight cells, particularly applicable to the manufacture of cellular ebonite. No. 526,565. Société Franco-Belge du Caoutchouc Mousse.

Rendering rubber fireproof. No. 526,566. Société Franco-Belge du Caoutchouc Mousse.

Separators for electric accumulators. No. 526,579. Chloride Electrical Storage Co., Ltd.

Production of fire extinguishing foam. No. 526,579. H. F. Hansen-Ellehammer.

Production of black-blue lacquer dyestuffs. No. 526,588. I. G. Farbenindustrie A. G.

Solvent treatment of mineral oil. No. 526,627. Standard Oil Development Company.

Production of cellulosic material from vegetable matter. No. 526,629. Celec Corporation, Ltd. et al.

Production of cellulose by digestion with calcium hydroxide and subsequent treatment with dilute caustic alkalis. No. 526,636. K. Hess.

Bonding compositions. No. 526,643. Corn Products Refining Co.

Detergent and germicidal compositions. No. 526,646. Mathieson Alkali Works.

Separation of gas mixtures. No. 526,652. British Oxygen Co., Ltd. et al.

Separation of mixed constituents in gaseous form. No. 526,653. British Oxygen Co., Ltd. et al.

Cooling of gaseous mixtures. No. 526,654. British Oxygen Co., Ltd. et al.

Method of stabilizing alkali metal alcoholates and alcoholic solutions of alcoholates and hydro-alcoholic solutions of alcoholates and hydroxides. No. 526,662. Mathieson Alkali Works.

Process and apparatus for the production of magnesium. No. 526,669. Aluminum-Industrie A. G.